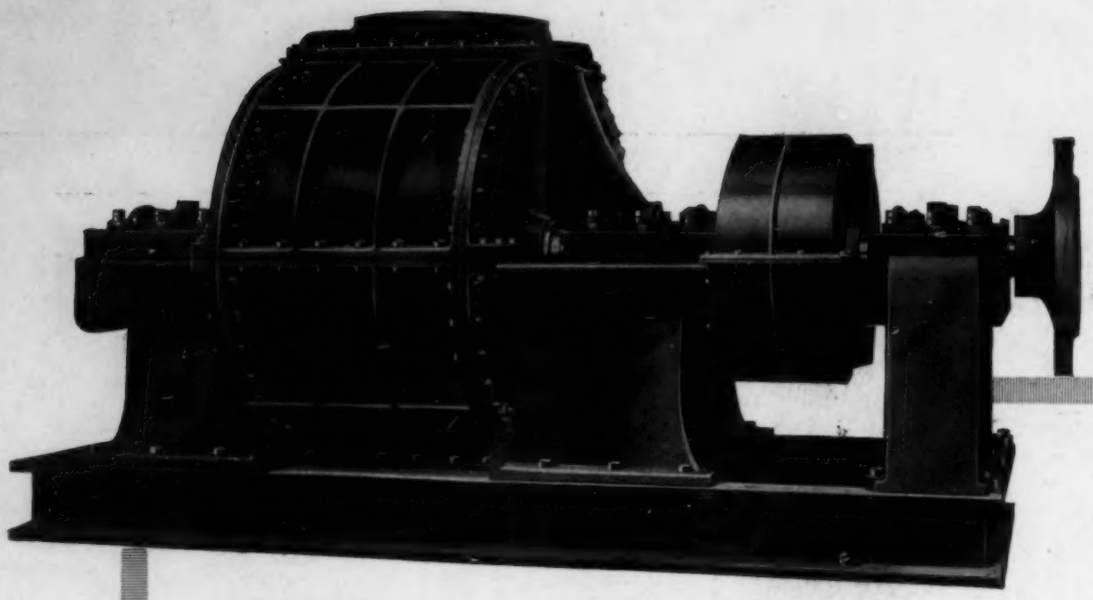
THE IRON TRADE REVIEW

Single Copies 15 Cents | CLEVELAND, DECEMBER 13, 1917 | Four Dollars a Year

DEC 14 1917
UNIV. OF MICH. LIBRARY

ONE Shot—
properly placed, may decide the engagement.
One or several Machine Tools constantly lagging behind the others will play havoc with production.
Trained men are none too plentiful—can you afford to waste their time grinding, treating, or otherwise trying to make good tools from inferior steel? The history of
"Red Cut Superior"
The Nationally Known First Quality
HIGH SPEED STEEL
is allied with the history of men whose lives have been devoted to research and specializing in the manufacture of high grade steels. These men insist that each bar of Red Cut Superior must contain the purest materials possible for money and brains to produce—and in addition to careful workmanship, every bar must undergo a rigid searching inspection.
We guarantee our customers that so far as it is humanly possible to make it so Red Cut Superior is the highest in quality since high speed steel was first introduced.
VANADIUM-ALLOYS STEEL CO.
PITTSBURGH, PA. Works at LATROBE, PA.

Advertisers' Index, pages 140-141. Contents, page 63. "Where-to-Buy," page 72.
Engineering Directory, pages 110-111. Classified Advertisements, pages 118-139.



Correct in Design—
Efficient in Operation—
Durable in Service

"CONNERSVILLE"
Gas Pumps
Exhausters and Boosters

Connersville Gas Pumps are so constructed that they will run continuously for years on their self-oiling gears and journals, with very little depreciation in efficiency, and with practically no repairs.

The service to which Connersville Gas Pumps, Exhausters and Boosters can be put is almost unlimited.

They can be used for handling air, gas, steam, etc.

Built for any capacity from 25 to 40,000 cu. ft. per minute, and for any pressure between one-half and ten pounds.

Write for Catalog

THE CONNERSVILLE BLOWER CO.

CHICAGO
929 Monadnock Bldg.

CONNERSVILLE, IND.

NEW YORK
114 Liberty Street

THE IRON TRADE REVIEW

Vol. LXI Cleveland, December 13, 1917 *No. 24*

Awaiting Further Action on Prices

Iron and Steel Industry Yet to be Advised of Result of Washington Conference But Talk of No Revision is Stronger—Storm Greatly Aggravates Traffic Conditions and Many Plants Close

BEFORE adjustment to the original fixed prices scarcely has been more than half carried out, the iron and steel industry finds itself weighing the possibilities whether or not it will be obliged to complete this realignment on a still lower level. Base prices, differentials and extras to conform to the Sept. 24 and subsequent announcements still are to be put into effect formally in many lines. Whether this will carry weight in the reaffirmation or revision of present prices Jan. 1, is yet to be shown. No definite decision on this question growing out of the conference of iron and steel producers and government representatives at Washington this week has been formulated, but the belief is stronger that no change may be made at this time. According to Washington reports, the conference was more occupied with the maintenance of production and the prompt filling of government needs, than with prices. Labor questions have assumed greater importance.

Storm Hits Production

Between speculation over further price revision and concern over spasmodic plant operations now rendered more precarious by country-wide storms of unusual severity, the industry has passed through another week of general unsettlement. The storm factor has been of great importance. Further retarding of coke deliveries has caused the banking of many blast furnaces. The lack of coal has brought about the wholesale closing of steel works and finishing plants. In the Cleveland district, the American Steel & Wire Co. has been forced to suspend operations in all of its eight plants. Production in the Youngstown district again has been set back by the shutting down of several works. The universal story of the industry continues one of shortage of essential supplies. Coal, coke, pig iron and scrap each are contributing a chapter. The proposal to exchange coke among producers in the Connellsville region, so that fuel may be dispatched from plants nearest the consuming point, has been recommended for adoption by the subcommittee of the special operating committee of eastern railroads. The H. C. Frick Coke Co., whose co-operation is essential to the successful operation of this plan, has not yet joined in the movement.

Catch Up on Orders

The effect of recent priority orders forbidding shipments of iron and steel for specified purposes which are considered as nonessential to war, is more apparent. Much tonnage for general consumers on mill books virtually has been nullified by this action. The result has been a strong concentration of shipments in certain channels of domestic trade not under the ban. Various orders which had not seemed likely to be shipped for months have been cleared. These consumers have been receiving more tonnage and in a different sequence than they had bargained for and there have been accompanying complications. Some of the mills have been able to catch up considerably on deferred deliveries. As to fresh buying, however, the same difficulties of private users to work in their requirements between government tonnages are shown.

Last Half Iron Sold

Selling of pig iron for the last half of 1918 is becoming more important. Both northern and southern iron has figured. Without exception this business has been done on the agreed base of $33, furnace, and is not subject to later revision. In all market centers the inquiry for iron for practically any delivery far exceeds the supply. Some of the heavy basic tonnage which has been before the furnaces has been closed, but buyers find it a slow and discouraging process to get metal. In the east, basic sales of the week exceeded 30,000 tons, and a St. Louis steelmaker who was seeking 20,000 tons has partially satisfied this inquiry at Chicago.

The indications are that iron ore prices covering the ensuing contracting season are likely to be named in the next few weeks. Discussion has been focused on the probability of some advance over the present season's schedule being allowed.

The Iron Trade Review

EDITORIAL

Better Fuel for Industries

THE pledge given by the Coal Mining Institute of America at the closing session of its annual meeting in Pittsburgh to "do its bit", by supplying the government with clean coal, is commendable. This means that operators will select with care their output for shipments, eliminating, as far as possible, by modern appliances "slate, boney coal and refuse". The institute went on record after hearing a stirring address by Francis S. Peabody, chairman of the committee of coal production, council of national defense, in which was pointed out the injury to warcraft by the use of dirty coal and the necessity of using nothing but the best grades. Obviously it is equally as necessary that industries be supplied with good coal as war vessels. For the lack of fuel of this character, the industries suffer and they cannot be impaired without weakening the military program which includes the furnishing of fighting equipment for battleships.

There has been considerable complaint recently on the part of steel and other manufacturing companies as to the poor quality of coal they have been receiving. Much of this no doubt has been due to the haste with which coal has been assembled and shipped in an effort to keep plants supplied. It is gratifying to know that the coal producers have recognized the necessity of supplying clean fuel and that they propose to exercise more care in seeing it is provided. This ought to be less difficult, now that the lakes have received more coal this year than ever before, and that the northwest has been furnished all-rail from the fields of Illinois and Indiana, nearly three times as much coal as they had by rail last year.

Negro Migration Ebbs

UNDUE prominence seems to have been given to the migration, or more properly, the importation of southern negroes into the north, during the past spring and early summer. Exaggerated reports at the time made the world apprehensive when the possibility of insufficient men to harvest the south's cotton crop was considered; much race antagonism also was fostered. Agents sent south were instrumental in procuring many negroes for work in northern shops and factories, which, latter, the negro regarded as the real edifices of his utopian dream. One northern interest encouraged the importation of negroes from the south and added many of this race to its force of employes. Once in the north, however, the negro found other companies offered more pleasant as well as more lucrative work and a large number, accordingly, deserted their original employer and went to work elsewhere. This condition prevailed in many instances and thus a reputation for undependability was acquired by the negro workman. Later many found climatic as well as living conditions less favorable in the north and with the coming of winter they came to long for their home in the sunny south. Trains southward bound now bear mute evidence of this fact. Gradually a condition which promised to have an important industrial significance is passing away.

Perhaps the Kaiser Chuckles

PROSPECTS are that within the next few weeks the present congress will take steps to revise the war revenue law passed by the last congress owing to the complexities of the excess profits section. Corporations throughout the country have been in a quandary as how the act is to be applied. The commissioner of internal revenue and the secretary of treasury were unable to point out the way. The board of excess profits tax advisers, appointed by Secretary McAdoo a short time ago, to untangle the knots, is said to have been unsuccessful. So the board turned to the legal advisers called in by Secretary McAdoo, but these legal experts were not able to solve the puzzle.

At present the advisers and the legal experts are combining their efforts, under the head of Samuel Untermyer, of New York, in a final tussle with the law. If this last attempt fails, it is probable congress will be asked to revise the entire excess profits section and to enact legislation that will be easier to interpret. Senator Simmons, chairman of the senate finance committee, admits the possibility of such revision, although he says he had hoped the advisers would be able to clear up the doubt as to the method of applying the fax. Senator Smoot of the finance committee was even more outspoken stating he thought the entire war revenue act ought to be repealed and a "rational, workable measure substituted for it."

The house ways and means committee started to frame the war tax bill in April, 1917, just after this country entered the war, and the President signed the completed bill Oct. 3, 1917, nearly six months later. Yet the net result of these six months' deliberations and discussions is an act which no one can interpret and apply, not even the framers themselves. It is incumbent upon business men, big and little, all over

The Iron Trade Review

EDITORIAL

the country, to pay heavy war taxes. How large would be their profits, and, accordingly, their taxes, if their individual financial policies were formulated along the same loose and incomprehensible lines as that of the world's greatest business interest, the United States government?

These regions now are in a comfortable position with regard to coal supplies. As a result, more attention may be given to shipments for the steel industry which is in pressing need of more and better fuel.

Making the Critics Responsible

A FEELING is growing in this country that the recent report of the interstate commerce commission on the unfortunate position of the steam carriers is about the broadest confession of error that railroad regulation yet has produced. Having been largely responsible for getting the railroads in their present hole, the commission can't even determine to its own satisfaction, which is the best way out. It would seem that the commission, after years of denying the railroads everything the latter considered necessary to keep their lines equipped for their big job, suddenly has thrown up their hands, chucked the job and has run to shelter under a last resort of government operation. Thus it has met one of the greatest crises in the history of the American railroads.

Government operation now stands in a new light and former conditions have been reversed completely. Those desiring efficient transportation above all else do not find the outlook promising. The railroads are not frightened at the prospect and the old bogey of government ownership has lost much of its threat.

The railroads adroitly have passed to those in authority the responsibility for their maintenance and the service they render as public utilities. This charge has been placed in a neat package, well-wrapped, and altogether it has had the appearance of a lovely gift. The recipients apparently feel much like a man suddenly handed a hot potato, and this lends an air of dismay to the unexpected report of the commission. The club which the latter has been wielding has been lost because the railroads have expressed a willingness to have the government try its hand at operations and show them how it should be done. Hence the precipitate retreat of the commission. Until the President speaks in his forthcoming message on transportation who is to boss the railroads in the near future the transportation problem will remain in doubt.

But the commission has made one thing clear. The 15 per cent increase in rates that a year ago would have made railroad equipment more adequate now is not even a palliative to the situation.

The Language of Trade

EFFORTS of American exporters in the Canary Islands, Spain, etc., were considerably hampered last year, according to the report of George K. Stiles, consul at Teneriffe, Canary Islands, largely because of the lack of familiarity with the Spanish language on the part of export managers and others in this country. It appears from his statement that correspondence written and business literature printed in other than Spanish frequently has been wasted. English is practically unknown to most of the buyers and frequently errors in connection with prices, terms, quantities, shipping agreements, etc., have been made. This has resulted not only in cancellations of orders, but a determination by the buyers to avoid repetitions in the future. It readily will be appreciated that there is often little time for translations, and if time is taken, even then the possibility of error is too great. Attractive catalogs and circulars prepared and mailed at great expense have gained nothing in return for the money and effort put upon them owing to their being printed in English. These have merely proved a source of exasperation to the importers who are anxious to transact business in America.

The case of the Canary Islands and Spain sounds a lesson for the American exporters and business men if they are to fulfill the part of international traders of standing to which so many are aspiring. With the present agitation sweeping the country for an intensive study of the French language for the advantages both in culture and in commerce, it would seem that an important omission is being made if an equal mastery of Spanish is not acquired at least on the part of the directing minds in American export houses or manufacturing plants which are working to extend their markets in foreign territory. What applies to the Canary Islands, applies also to Mexico, South America and other territories where Spanish is the general language of business and society. For a nation to do a worldwide business and to continue to do it, its commercial representatives must be equipped to present their case effectively at all times. This also means that the sooner this country realizes that the customs and wishes of the buyer are a paramount consideration in foreign trade, the better will be its record of success in that field.

Iron and Steel Prices

Corrected to Wednesday Noon

SCRAP, WAREHOUSE AND IRON ORE PRICES ON PAGE 1302

PIG IRON

Bessemer valley	$36.30
Bessemer, Pittsburgh	37.25
Basic, Pittsburgh	33.95
Basic, eastern Pa.	33.00
Basic, Buffalo	33.00
Malleable, Pittsburgh	34.45
Malleable, Chicago	33.50
Malleable, Philadelphia	37.00 to 37.50
Malleable, Buffalo	33.50

GOVERNMENT SCHEDULE

1.75 to 2.25 silicon (No. 2 foundry, No. 2 plain, and No. 3 southern).....$33 furnace base
2.25 to 2.75 silicon (No. 2X, No. 1 Northern foundry, and No. 2 southern)..... base plus 50c
2.75 to 3.25 silicon (No. 1X, No. 2 soft).....base plus $1.50
Over 3.25 silicon..... $34.50, plus $1.00 for each ½ per cent of silicon.

No. 1X, Phila.	35.00 to 35.25
No. 2 foundry, Pittsburgh	33.95
No. 2 foundry, Cleveland	33.95
No. 2 foundry, Ironton	33.00
No. 1 foundry, Chicago	33.50
No. 2 foundry, Chicago	33.00
No. 2X foundry, Phila.	34.00 to 34.25
No. 2X foundry, N. J. tide.	34.25 to 34.50
No. 2X foundry, Buffalo	33.50
No. 2 plain, Philadelphia	33.50 to 33.75
No. 2 plain, N. J. tide	33.75 to 34.00
No. 2 southern, Birmingham	33.00 to 33.50
No. 2 southern, Cincinnati	36.40
No. 2 southern, Chicago	37.50
No. 2 southern, Phila. del.	38.30 to 39.40
No. 2 southern, Cleveland	37.50
No. 2 southern, Boston	39.50
No. 2 southern, St. Louis	35.90
Virginia, No. 2X, furnace	33.50
Virginia, No. 2X, Phila.	36.77
Virginia, No. 2X, Jersey City	37.02
Virginia, No. 2X, Boston	37.27
Silveries, 8 per cent, furnace	46.00
Silveries, 8 per cent, Chicago	48.54
Low phos. standard, Phila.	55.00 to 56.00
Low phos. Lebanon furnace	50.00
Low phos., Pittsburgh	53.00
Charcoal, Superior, Chicago	37.50
Charcoal, Superior, Buffalo	39.75
Charcoal, southern, furnace	43.00

COKE

(At the ovens.)

Connellsville furnace	$6.00
Connellsville foundry	7.00
Wise county furnace	6.00
Wise county foundry	7.00
Pocahontas furnace	6.00
New River foundry	7.00
New River furnace	6.00

FERRO ALLOYS

Ferromanganese delivered	$250.00 to 255.00
Spiegel, 20 per cent fur.	60.00 to 61.50
Ferrocarbon titanium, carloads, maker's plant	160.00
Ferrosilicon, 50 per cent, Pittsburgh	175.00
Ferrosilicon, 50 per cent, Pitts., 1st quarter	160.00 to 170.00
Bessemer ferrosilicon, 9 per cent.	$51.70
Bessemer ferrosilicon, 10 per cent.	55.00
Bessemer ferrosilicon, 11 per cent.	58.30
Bessemer ferrosilicon, 12 per cent.	61.60

Ferrosilicon prices at Ashland, Ky., Jackson and New Straitsville, O.

SEMIFINISHED MATERIAL

BILLETS

Open hearth, Pittsburgh	$47.50
Open hearth, Philadelphia	50.50
Open hearth, Youngstown	47.50
Bessemer, Pittsburgh	47.50
Bessemer, Youngstown	47.50
Forging, Pittsburgh	60.00
Forging, Philadelphia	63.00

SHEET BARS

Open hearth, Pittsburgh	$51.00
Open hearth, Youngstown	51.00
Bessemer, Pittsburgh	51.00
Bessemer, Youngstown	51.00

WIRE RODS AND SKELP

Wire rods, Pittsburgh	$57.00
Grooved skelp, Pitts.	2.90c
Sheared skelp, Pitts.	3.25c

SHAPES, PLATES AND BARS

(In cents per pound)

Structural shapes, Pitts.	3.00c
Structural shapes, Phila.	3.185c
Structural shapes, N. Y.	3.195c
Structural shapes, Chicago	3.00c
Tank plates, Chicago	3.25c
Tank plates, Pittsburgh	3.25c
Tank plates, Philadelphia	3.435c
Tank plates, New York	3.445c
Bars, soft steel, Pittsburgh	2.90c
Bars, soft steel, Chicago	2.90c
Bars, soft steel, New York	3.095c
Bars, soft steel, Phila.	3.085c
Bar iron, Chicago	3.50c
Bar iron, Philadelphia	3.685c
Bar iron, Cleveland	3.64c to 3.70c
Bar iron, New York	3.695c
Bar iron, Pittsburgh	3.50c
Hard steel bars, Chicago	3.25c
Cotton ties, Pitts., Nov.	$2.16

RAILS, TRACK MATERIAL

Angle bars, Pittsburgh, base	3.75c to 4.00c
Angle bars, Chicago, base	3.25c to 4.00c
Standard bessemer rails, mill	$38.00
Stand open hearth rails, mill	40.00
Light rails, 25 to 45, mill	3.00c
Relaying rails, light, St. L.	75.00 to 80.00
Spikes, railroad, Pittsburgh	4.50c to 5.00c
Spikes, railroad, Chicago	5.00c to 5.25c
Track bolts, Pittsburgh	6.50c to 7.00c
Track bolts, Chicago	5.25c to 6.50c
Tie plates, Chicago	$70.00 to 75.00

WIRE PRODUCTS

(Per 100 lbs. to jobbers; retailers 5c more)

Wire nails, Pittsburgh	$3.50
Coated nails, Pittsburgh	3.45
Plain wire, Pittsburgh	3.25
Galvanized wire, Pittsburgh	3.95
Polished staples, Pittsburgh	3.65
Galvanized staples, Pittsburgh	4.35
Barb wire, painted, Pittsburgh	3.65
Barb wire, galvanized, Pitts.	4.35
Cut nails, Pittsburgh	....

CHAIN, PILING, STRIP STEEL

(In cents per pound)

Chain, ⅜ in. proof coil, Pitts. 8.00c
Sheet piling, base, Pittsburgh 4.00c to 5.00c
Cold rolled strip steel, hard coils, 1½ inches and wider by 0.100 inch and heavier, base per 100 pounds, 6.50c.

Market Report Index

	Page
Weekly Market Review	1247
Pig Iron	1251-1252
Coke	1253
Scrap	1254
Semifinished Steel	1255
Merchant and Cast Pipe	1256
Bars	1256
Tin Plate	1256
Nuts, Bolts and Rivets	1256
Sheets	1257
Warehouse	1257
Plates	1258
Iron Ore	1258
Structural Shapes	1259
Wire	1259
Rails and Track Materials	1259
Nonferrous Markets	1262
Coke By-Products	1291
Machine Tools	1294

SHEETS

(In cents per pound.)

SHEET MILL BLACK

No. 28, open hearth, Pitts.	5.00c
No. 28, bessemer, Pitts.	5.00c
No. 28, open hearth, Chic.	5.215c

TIN MILL, BLACK

No. 28, open hearth, Pitts.	5.00c
No. 28, bessemer, Pitts.	5.00c

GALVANIZED

No. 28, open hearth, Pitts.	6.25c
No. 28, bessemer, Pitts.	6.25c
No. 28, open hearth, Chic.	6.465c

BLUE ANNEALED

No. 10, open hearth, Pitts.	4.25c
No. 10, bessemer, Pitts.	4.25c
No. 10, open hearth, Chic.	5.715c to 6.215c
No. 10, open hearth, Phila.	4.435c

TIN PLATE

(Per 100 lb. box)

Tin plate, coke base, Pittsburgh.....$7.75

IRON AND STEEL PIPE

Base Pittsburgh

Base Pittsburgh	Black Per cent off	Galv. Per cent off
⅛ to 3 in., butt, steel	51	37½
¼ to 3 in., butt, iron	33	17

BOILER TUBES

Steel, 3½ to 4½ inches, l. c. l. 30
Iron, 3½ to 4½ inches, c. l. 12½

CAST IRON WATER PIPE

(Class B Pipe.)

Four-inch, Chicago	56.50
Six-inch and over, Chicago	53.50
Four-inch, New York	57.50
Six-inch and over, New York	54.50
Four-inch, Birmingham	48.00
Six-in. and over, Birmingham	45.00

Class A pipe is $1 higher than Class B.

HOOPS, BANDS, SHAFTING

Hoops, Pittsburgh	3.50c
Bands, Pittsburgh	2.90c
Shafting, Pittsburgh, carloads	17 off to list

RIVETS

Structural rivets, Pittsburgh	4.65c
Boiler rivets, Pittsburgh	4.75c
Rivets ⅞ in. and smaller, Pitts.	45 and 10 off

NUTS AND BOLTS

(Delivered within 20-cent freight radius.)

CARRIAGE BOLTS

(⅜ x 6 inches, smaller and shorter)

Rolled thread	50–5 off
Cut thread	40–10–5 off
Larger and longer	40 off

MACHINE BOLTS

(⅜ x 4 inches, hot pressed nuts)

Rolled thread	50–10–5 off
Cut thread	50–5 off
Larger and longer	40–10 off
Cold pressed semi-finished hexagon nuts ⅜ in. and larger	60–10–10 off
Cold pressed semi-finished hexagon nuts ⅞ in. and smaller	70–5 off
Gimlet and cone point lag screws	50–10 off

NUTS

Hot pressed, square blank	2.50c off
Hot pressed, square tapped	2.30c off
Hot pressed, hexagon blank	2.30c off
Hot pressed, hexagon tapped	2.10c off
Cold pressed, square blank	2.25c off
Cold pressed, square tapped	2.00c off
Cold pressed, hexagon blank	2.25c off
Cold pressed, hexagon tapped	2.00c off

Prices Present and Past

(Yesterday, a month ago, three months ago and a year ago.)

Quotations on leading products December 12, average for November 1917, average for September 1917, and average for December, 1916. Prices are those ruling in the largest percentage of sales at the dates named

	Prices Dec. 12, 1917.	Average prices Nov., 1917.	Sept., 1917.	Dec., 1916.
Bessemer pig iron, Pittsburgh..	$37.25	$37.25	$48.27	$35.95
Basic pig iron, Pittsburgh.....	33.95	33.95	43.95	30.95
*No. 2 Foundry pig iron, Pitts.	33.95	33.95	48.95	31.70
*No. 2 Foundry pig iron, Chic.	33.00	33.00	49.50	29.25
Lake Superior Charcoal, Chicago	37.50	37.50	59.50	32.00
Malleable, Chicago	33.50	33.50	49.50	29.25
**Southern, No. 2, Birmingham.	33.50	33.50	43.50	23.00
*Southern Ohio No. 2, Ironton.	33.00	33.00	49.50	30.00
Basic, eastern Pa.....	33.00	33.00	49.50	30.00
**No. 2X Virginia, furnace....	33.50	33.50	50.75	26.00
**No. 2X foundry, Philadelphia.	34.00	34.00	53.25	29.50
Ferro mang., delivered.....	250.00	247.00	378.00	160.00
Bessemer billets, Pittsburgh....	47.50	47.50	73.75	58.75
Bessemer sheet bars, Pittsburgh	51.00	51.00	82.50	58.75
Open hearth sheet bars, Pitts..	51.00	51.00	82.50	58.75
Open hearth billets, Pittsburgh.	47.50	47.50	73.75	58.75
Steel bars, Pittsburgh.....	2.90	2.90c	3.725c	2.925c
Steel bars, Chicago.....	2.90	2.90c	4.10c	3.10c
Iron bars, Philadelphia.....	3.685	4.335c	4.935c	3.059c
Iron bars, Cleveland.....	3.64	4.00c	4.50c	3.00c

	Prices Dec. 12, 1917.	Average prices Nov., 1917.	Sept., 1917.	Dec., 1916.
Iron bars, Chicago mill.....	$3.50	4.10c	4.50c	2.85c
Beams, Chicago	3.00	3.00c	4.46c	3.20c
Beams, Pittsburgh	3.00	3.00c	3.75c	3.025c
Beams, Philadelphia	3.185	3.185c	4.435c	3.409c
Tank plates, Pittsburgh.....	3.25	3.25c	6.8125c	3.525c
Tank plates, Chicago.....	3.25	3.25c	7.33c	3.75c
Tank plates, Philadelphia.....	3.435	3.435c	7.75c	4.159c
Sheets, blk., No. 28, Pittsburgh	5.00	5.30c	8.75c	4.50c
Sheets, blue anld., No. 10, Pitts.	4.25	4.60c	8.50c	4.00c
Sheets, galv., No. 28, Pittsburgh	6.25	6.50c	9.6875c	6.25c
Wire nails, Pittsburgh.....	3.50	$3.50	$4.00	$3.00
Connellsville fur. coke.....	6.00	6.00	9.625	4.44
Connellsville fdy. coke.....	7.00	7.00	12.50	6.00
Heavy melting steel, Pittsburgh	30.00	29.60	35.50	25.00
Heavy melting steel, eastern Pa.	29.00	27.50	31.25	24.00
Heavy melting steel, Chicago...	28.50	28.50	32.65	23.35
No. 1 wrought, eastern Pa.....	35.00	35.70	44.50	27.00
No. 1 wrought, Chicago, net ton	31.00	30.60	36.25	25.35
Rerolling rails, Chicago.....	35.00	35.70	41.25	29.50
Car wheels, Chicago.....	29.00	27.50	31.00	21.85

*1.75 to 2.25 silicon. **2.25 to 2.75 silicon.

(For Additional Prices See Page 1302)

Buyers Take All Pig Iron Offered

Pending Inquiry Which is Growing Steadily Still Far Exceeds Supply—Selling for Last Half of 1918 More General—Government Having Difficulty to Get Low Phosphorus to Fill Urgent Needs

Philadelphia, Dec. 10.—Heavy buying of basic, totaling 31,000 tons, again developed here during the past week. In each case the buyer took as much tonnage as he could get. Large tonnages still are wanted, but they are unobtainable. In fact, eastern makers have disposed of practically all the basic they will make during the first half. Among the buyers of this grade during the week were the Lukens Steel Co., the Phoenix Iron Co., the Worth Steel Co. and the Alan Wood Iron & Steel Co. With the exception of 6000 tons, all of this iron is for second quarter. Sales of standard low phosphorus during the week totaled 12,000 to 15,000 tons mostly for second half. This grade also is sold ahead to such an extent that no more can be obtained, unless probably for the tail end of 1918. Inquiries for 20,000 to 25,000 tons of standard low phosphorus for government requirements cannot be filled because the makers have all they can do to fill urgent government orders previously booked. One of the interests wanting standard low phosphorus for government work is the Tacony Ordnance Corp., which is out for 10,000 to 15,000 tons of various grades. In copper bearing low phosphorus, sales have been light, totaling about 2000 tons. Recent sales of bessemer total at least 7000 tons, of which about half was taken by an eastern ingot mold manufacturer. Numerous inquiries for bessemer still are pending, including 1000 tons for a bar iron maker. Various inquiries are out for malleable but it is impossible to get this grade. Demand for foundry is heavy, but consumers are finding it very difficult to place their requirements. Several melters wanting several thousand tons each for first half cannot find sellers, and a great many smaller inquiries are going begging. So far only two eastern furnaces have shown willingness to take on third quarter tonnage, and then only from regular customers. The National Radiators Co.'s inquiry for 12,000 tons for second, third and fourth quarters apparently remains open.

Weather Further Blocks Traffic

Buffalo, Dec. 11.—There is a good inquiry for pig iron, but producers are compelled to disregard this, as they are unable to promise deliveries. The rail situation and the coke situation have combined to tie up the iron market at a time when demand is extensive and needs are urgent. To the bad traffic conditions now has been added peculiar weather conditions, which have tied up almost completely the roads entering Buffalo. With sold-up conditions and unwillingness to quote until the general atmosphere clears, an insignificant tonnage was disposed of during the past week in this district. There was good inquiry on hand, including two for 10,000 tons of basic each. These went begging. Two iron interests are entirely out of the market, one for six months and the other indefinitely.

Sell Third Quarter Foundry

New York, Dec. 11.—It is estimated that sales of foundry iron in this district so far made for second half, total at least 100,000 tons. The larger portion of this is for third quarter. Practically all of the furnaces who have taken such tonnages are disposed to restrict further bookings of this kind, and to take them only from old customers. It now is almost impossible to get foundry iron from

eastern furnaces for first half delivery. Makers generally have advised sellers that they cannot take on any more tonnage, except possibly a small block here and there to help out a regular customer. Inquiries for foundry are heavy. One favorable development is that shipments of pig iron from the south are beginning to come through. For a time, shipments of iron from southern furnaces to this district fell off entirely. Now, however, shipments are being accepted by the southern railroads where priority shipments for government purposes are designated. As a result of this improvement, several thousand tons of southern iron have been sold in this district during the past week. The National Enameling & Stamping Co., recently put out an inquiry for basic for its St. Louis plant, but has not been able to obtain this in the east.

Last Half Sales Made

Cleveland, Dec. 11.—Producers more freely are opening their books for sales for the last half of 1918. A number of transactions in foundry iron for that period have been closed during the week. These sales were made on the agreed basis of $33, furnace, for 1.75 to 2.25 silicon and are not subject to any revision should the fixed schedule subsequently be altered. Some Alabama iron also was sold in this district this week for the last half under similar arrangements. New inquiry for various grades still is active, although it is not as voluminous as in the preceding week. A heavy tonnage of unclosed basic remains in the market, the buyers having been unable to find metal to cover their needs. Some of this business now has been in the market for two or three weeks and is practically going begging. The aggregate amount from nearby territory probably runs 75,000 to 100,000 tons. The Crucible Steel Co. recently has been figuring on a small tonnage for its Norwalk, O., plant. Consumers of foundry iron constantly are harder pressed, both to get deliveries on current orders and to place additional lots. Some of them are in such sore straits that they have become discouraged and are reconciling themselves to early shut-downs. Operating difficulties of the furnaces are little changed. A Toledo stack was forced to bank for several days this week owing to the fuel administrator commandeering a tonnage of the by-product coke for consumers in Detroit.

Last Half Sales at Chicago

Chicago, Dec. 11.—A heavy inquiry for all grades of pig iron is being received in the Chicago district and the tonnage is much in excess of that obtainable from the furnaces. Buying for last half of 1918 is being done to some degree although there is no rush of consumers to cover that far ahead. Sales have been made by local interests for third quarter and some Lake Superior charcoal iron has been sold for last half. All northern makers appear willing to sell for any delivery to the end of 1918 and some melters believe it is wise to cover immediately for their requirements. A southern Wisconsin manufacturer is inquiring for 3000 tons each of foundry and malleable iron and another inquiry is current for 5000 to 10,000 tons of foundry. A user of basic iron at East St. Louis recently inquired for 20,000 tons of that grade and is understood to have placed part of this tonnage with a Chicago maker for delivery over the second and third quarters of 1918. Shortage of iron in foundry yards is indicated by the fact that delay in delivery has caused plants to shut down in some instances. Shippers are using every effort to keep customers supplied and are successful in most cases. Few important southern producers are willing to sell iron at present. One large interest has not sold beyond the first quarter and has not yet opened books for the full first half. Numerous small interests, especially those producing high silicon iron, have not yet sold any tonnage for 1918 as they have been unable to contract for their coke supply and do not feel justified in selling under the circumstances. Lake Superior charcoal ironmakers have sold practically their entire production for the first half and are now taking contracts for last half, although this business has not assumed large proportions. Considerable off iron is being produced, especially in basic, but no difficulty is experienced in disposing of this to foundrymen, who can use it in their mixtures. This is having the effect of furnishing some spot iron to meet the strong demand.

See Small Hope of Relief

Cincinnati, Dec. 11.—Practically all hope has been abandoned that the shortage of iron will be relieved at any early date. Northern furnaces are almost entirely sold up to July 1 next year, and Virginia producers have very little iron to offer with the exception of the usual odd casts that are available at times. The situation in the south is a little more satisfactory; at the same time only a few companies are soliciting business. As far as the railroads are concerned, the present severe weather has caused an almost complete cessation of shipments from different points, and has indefinitely delayed iron already enroute. Numerous messages are received, asking if cars can be diverted in order to take care of urgent needs of different melters of foundry iron. Basic users, while not actually in want for an immediate supply, are somewhat apprehensive for the future. The scarcity of both foundry and basic will be augmented by transportation difficulties that are bound to cause the closing down of many furnaces through coke shortage. Some foundry iron business was booked early last week, principally small lots for first quarter shipment. A comparatively small quantity of foundry iron also has been bought for last half of 1918. Some basic is said to have been sold to nearby steelmakers, but confirmation cannot be obtained as to any specific tonnage.

Snap Up Every Offering

St. Louis, Dec. 11.—The pig iron market continues to mark time. All dealers and producers report an enormous demand, but exceedingly scant supplies. Principal consumers in the district are casting about busily to cover their requirements. Actual sales during the week were confined to small lots, but inquiries cover upwards of 15,000 tons. Regular customers of the larger producers seem to be faring well, but these makers are not offering anything for sale. This is especially true of the southern furnaces. One feature of the situation, according to dealers, is that their larger customers have asked that they be advised if any salable surplus becomes available. In that event they request this be added to their specific orders indicating their apprehension relative to future supplies. A representative of an important eastern producer reported he could place 15,000 to 20,000 tons over the telephone within an hour if it was available. Government orders are being given right of way. In the opinion of many observers, it is only a matter of time before distribution will be on a ration basis with war work being served first. There is a dearth of 2.25 to 2.75 silicon grades, according to representatives of Birmingham furnaces.

Idle Furnaces Resume

Birmingham, Ala., Dec. 11.—Inquiries for pig iron still are numerous in the south and a few small lot sales are being made for delivery during the first half of the coming year at the government price of $33, furnace, for 1.75 to 2.25 silicon. There is very little iron left for the first half of

1918 and there is small inclination to sell for last half of the year. The production of iron in the Birmingham district has been lagging. The two stacks of the Republic Iron & Steel Co. at Thomas, which have been banked because of coke shortages, now have been started, as has also the new furnace at Sheffield, of the Sloss-Sheffield Steel & Iron Co. Deliveries still are not up to the desired amount. Effort is being made in this district to have lifted some of the embargoes with conecting lines, especially into the Pennsylvania district. Shipment of about 8000 tons a month of basic iron from the Tennessee Coal, Iron & Railroad Co. to the Pencoyd, Pa., plant of the American Bridge Co., is being arranged. Transportation is the difficulty. Small foundries throughout the country freely are making inquiries for iron. Home consumption is steady, notwithstanding the fact that the cast-iron pipe market is lagging and the plants need business.

Many Furnaces Forced to Bank

Pittsburgh, Dec. 11.—Numerous furnaces in this district have been compelled to bank, owing to their inability to obtain coke. Shipments have been sharply curtailed on account of the cold weather which has severely tied up traffic. Banking began yesterday and is continuing. The closing down of the furnaces has meant a large loss of production, and it will become much greater before operations are restored to a normal basis. This situation naturally will be reflected in the steel output, which has been considerably below requirements. The movement of coke has been greatly restricted for some time, and the cold wave added greatly to the already bad congestion which was just beginning to show improvement. In some instances operators of both steel works and merchant furnaces have been compelled to bank all or most all their stacks. This, added to the extreme scarcity of pig iron that has been prevailing in the Pittsburgh district for the past month, is the cause of considerable apprehension. Railroad embargoes are also a source of considerable annoyance in this district, the situation in this respect having become worse. This has made it impossible for some furnaces to make shipments which are being sought urgently. Most of the foundries and the steel companies, including the larger ones, have been inquiring in vain for iron. During the past week, inquiries have declined consumers realizing that there are no offerings. There has also been an extreme shortage of gas, which has forced down many plants.

Coke Congestion is Worse

Storm Intensifies Previous Tieup and Many Blast Furnaces Forced to Bank—Plan to Avoid Cross Shipments Recommended

Pittsburgh, Dec. 11.—Traffic conditions having been demoralized as the result of the cold wave, shipments of coke have been greatly curtailed below the restricted movement previously under way. The shortage of fuel at blast furnaces in consequence has increased greatly and has forced a number of stacks to be banked. While moderating weather is in immediate prospect, it will be some time before the congestion of traffic is relieved appreciably. The interruption in shipments came just at a time when the movement from the Connellsville region was freer than previously and has caused much concern on the part of coke consumers. They have been making every possible effort to secure shipments, even seeking tonnages that in normal times would not be considered worth while. The committee of coke operators appointed last week to take up plans for relieving the shortage has made a full report with recommendations to J. B. Yohe, chairman of a committee authorized by the general operating committee of the eastern railroads. The coke committee has suggested changes in the traffic conditions in the Connellsville regions, one of the principal proposals providing for elimination, as far as possible, of cross shipments. It is appreciated that this kind of traffic movement cannot be done away with entirely. Makers of low phosphorus iron will have to continue receiving low phosphorus coke and producers of bessemer iron will also have to obtain this grade of fuel to a more or less extent. But it is not believed makers of basic and foundry iron will be seriously affected by trading coke tonnages. The car supply in the Connellsville region last week averaged 70 per cent. On the Monongahela railroad, which supplies most of the independent furnaces, the average on Monday of this week was 70 per cent, today it was 30 per cent and tomorrow will be 30 per cent. Production for the week ended Dec. 1 was 295,316 tons as compared with 316,017 tons the preceding week, according to the *Connellsville Courier*.

Blizzard Stops Business

Cincinnati, Dec. 11.—A renewal of a number of foundry contracts was under way the first part of last week, but the blizzard which struck this section Friday night has put an end to all negotiations along this line. The chief concern now is to get a supply, a problem that seems impossible of solution due to shipping delays. The furnaces also are alarmed and are making frantic appeals both to the oven operators and the transportation companies.

Supply Grows Scarcer

St. Louis, Dec. 11.—According to dealers and consumers in this district, coke is becoming increasingly scarce. In the St. Louis district proper, and the great southwest, to which this city is the leading gateway, the demand vastly exceeds available supplies. Urgent inquiries were received this week from scattered points in the region extending to the Rio Grande river.

Supply Short in South

Birmingham, Ala., Dec. 11.—While records show that there is an increasing output of coal and coke in the southern territory, the supply appears to be short. This is accounted for by the growth of demand. The loss of washed coal from the Sayreton mines of the Republic Iron & Steel Co. by reason of a fire recently remains a factor. State and local fuel boards are working incessantly to relieve situations and co-operation is being given by the railroad officials.

Books Much Foundry Tonnage

New York, Dec. 11.—The New England by-product coke producer continues to book a large amount of foundry coke, both for first half and all of 1918, at $15, delivered. This delivered price, of course, results in considerable variation in the net price at the ovens, which depends upon the freight rate to the consuming point. Because of the difficulty in getting coke from western Pennsylvania, New York district consumers have purchased considerable New England by-product coke for first half.

Getting Up Production

All departments of the Milton Mfg. Co., Milton, Pa., which has a contract for schrapnel cases for the United States government, gradually are being placed into operation. Five hundred men now are being employed, and it is expected that the full complement of three shifts of 600 men each will be employed within a month.

Scrap Supplies Inadequate

Numerous Buyers Want More Tonnage Than They Can Obtain—Prices Stronger—Storm Further Demoralizes Traffic Conditions

FOR COMPLETE SCRAP PRICES SEE PAGE 1302

Philadelphia, Dec. 10.—Eastern Pennsylvania consumers who last week were offering to pay $27, delivered, for heavy melting steel, now are bidding $28. Even at this price it is difficult to get this grade, and in fact no sales of importance have been made during the past week. The market on heavy melting steel now is quoted at $28 to $30, delivered. Incidentally, Pittsburgh dealers in all cases are willing to buy steel here at the government maximum of $30, delivered, either to cover old contracts or because they are so anxious to get the material they are willing to forego a profit. Wrought scrap is exceedingly scarce. For long yard wrought $35 has been paid, or the price fixed as the maximum on No. 1 railroad wrought, which usually commands at least $5 more. Were it not for the government price, No. 1 railroad wrought probably now would be bringing at least $40, delivered. It is understood that selected yard wrought has brought in excess of $35. No. 1 railroad wrought practically has disappeared from the market. Foundry grades are in good demand.

Storm Adds to Troubles

Cincinnati, Dec. 11.—An addition to the troubles of scrap merchants was made by the storm Saturday. Shipments that had been accepted the day before are doubtless still on the way to destination. A dealer having business in different parts of the country states that the tie-up in the central west is worse than in the history of his concern. The general snow storm has been the cause of the latest transportation delays, but the preceding shortage of both motive power and cars contributed in no small degree. Although the demand for scrap is light, prices are firm and have been advanced on some grades of cast.

Supplies Still Lacking

Boston, Dec. 10.—The situation in old material has undergone no special change. There still is a good demand, but actual business is rather small for want of supplies. Little material is coming in owing to railroad embargoes and the same cause operates to keep down the outward movement. Wholesale dealers' paying prices per gross ton, f.o.b. shipping points, follow: Wrought No. 1, long, $28 to $29; horseshoes, $28 to $29; cotton ties, $20 to $21; stove plate, $19 to $20; No. 1 machinery, $30 to $30.50; No. 2 machinery, $28 to $29, car axles, steel, $42 to $44; iron, $49 to $50; rerolling rails, $50; iron boiler plate, $34 to $35; bundled barrel hoops, $17.50 to $18; wrought iron pipe, $24 to $25; steel rails, $25 to $26; No. 1 railroad steel, $25 to $26; heavy melting steel, $24 to $25; axle turnings, $18 to $19; machine shop turnings, $15 to $16; cast borings, $17 to $17.50; drop forge trimmings, $21 to $22; cast iron car wheels, $30 to $32.

Weather Ties Up Shipments

Buffalo, Dec. 11.—There has been no change in the scrap market over the conditions of a week ago, when much strength was exhibited. There is a real shortage of heavy melting steel with scarcely any available in the district. Almost all the yards are near depletion in stocks of this grade. In the face of this shortage there is an unusually pressing demand which stands little chance of being satisfied for some time to come. Embargoes are being placed at additional consuming points and to this tangle of traffic conditions has been added in the past four days, most unusual weather conditions which have effectually tied up what movements of scrap were going forward. It is impossible at present to make any shipments, so severe are the snow conditions throughout the district and beyond. No marked let-up in these conditions for the next few days is expected. Some dealers are not attempting to do any business. Railroad lists are light. Country scrap is hopelessly tied up for the present time.

Stronger at Cleveland

Cleveland, Dec. 11.—Scrap quotations have been advanced from 50 cents to $1 in heavy melting steel, bundled sheets, hydraulic pressed sheets, short steel rails, axle turnings, car wheels, grate bars and No. 1 cast in the Cleveland market. Demand is livelier and more business is in prospect. Signs of the heavy buying usual in December are beginning to multiply, although dealing has not yet reached important proportions. Congested traffic continues to restrict both buying and deliveries. It is expected by some that there will be an increased quantity of shipping by motor truck where deliveries are from one point to another in the same district. Quite a few deliveries of cast scrap are made to smaller companies in normal times in this way. It is expected that ways will be found of relieving at least a portion of railroad traffic by increasing the number and tonnage of such deliveries.

Chicago Market Quiet

Chicago, Dec. 11.—Quotations on iron and steel scrap in the Chicago market remain fairly steady and some buying is being done, although this has not reached the point of producing an active market. Most consumers are taking some scrap but are not building up their reserves as supplies are somewhat short because material is not coming out from its usual sources to the ordinary amount. Railroads are offering scrap in larger tonnages than recently, but not to the extent desired. The Chicago, Milwaukee & St. Paul offers a list of 2400 tons which includes 1000 tons of steel rails. Other lists include the Wabash, 2000 tons; the Union Pacific, 1700 tons; the Monon, 600 tons; the Chicago, St. Paul, Minneapolis & Omaha, 830 tons, and the Kansas City Southern, 200 tons.

Short Supply Prevents Sales

St. Louis, Dec. 11.—The market for iron and steel scrap continues lifeless and without feature. There are scarcely enough transactions upon which to base accurate quotations. Nos. 1 and 2 railroad wrought are very scarce, and it is generally understood several of the leading mills willingly would pay maximum prices. Consumers of heavy melting steel are beginning to enter the market, and a few sales at the government maximum have been reported during the past few days. Relaying rails continue very strong and scarce. Inquiries for relayers were received here this week from South America. Offerings of all grades are small, and with the advent of inclement weather, are expected to dwindle further. Railroad offerings this week were as follows: Cleveland, Cincinnati, Chicago and St. Louis, 2500 tons; Wabash, 1500 tons; Union Pacific, 1200 tons; Kansas City Southern, 300 tons; and a small miscellaneous list from the Cotton Belt.

Southern Dealers Want Cars

Birmingham, Ala., Dec. 11.—Iron and steel scrap dealers in southern territory are appealing through the American Board of Scrap Iron Deal-

ers for some relief from a recent ruling by Judge Lovett, of the priorities committee, with reference to the use of railroad cars in the transportation of scrap. The famine in pig iron in Pennsylvania and in the western districts has brought about a strong inquiry for scrap in the south and the government schedule of price can be realized if there was any way of making deliveries. Stocks of scrap here are low but it is believed any considerable buying would stimulate collections. Southern consumers of scrap are far from offering the figures fixed by the government. Several changes in quotations are noted this week.

Sell to Pittsburgh Dealers

New York, Dec. 11.—Numerous 1000 and 2000-ton lots of heavy melting steel are being sold by dealers here to eastern Pennsylvania consumers. Pittsburgh dealers also are anxious to buy, but the prices which they are forced to quote under the government maximum at present are not attractive here. All grades of scrap are in good demand. Wrought particularly has been selling freely to eastern Pennsylvania consumers. Foundry grades are wanted extensively by local foundries, due to the scarcity of pig iron. The physical side of the scrap business presents many problems nowadays. Difficulties are encountered particularly in making shipments, owing to the railroad embargoes. The railroad scrap lists are much smaller than usual. The Pennsylvania railroad, the New York Central and the Central Railroad of New Jersey all closed such lists during the past week.

Heavy Inquiries Are Out

Pittsburgh, Dec. 11.—Heavy inquiries for scrap, affecting most all of the grades, are coming to dealers in the Pittsburgh district who are unable to meet the demand. The most urgent inquiries are for heavy melting steel, sizeable tonnages of which have been sold in this district at the government price of $30, delivered, consuming points. Dealers are having great difficulty in making shipments, owing to embargoes, and report that their stocks are either low or entirely depleted. Some of them have found it impossible to obtain supplies, claiming that since the regulation of price went into effect, the natural movement is for scrap to go from points of origin to the nearest points of consumption.

The Alan Wood Iron & Steel Co. expects to complete its No. 3 blast furnace at Swedeland, Pa., about the middle of 1918.

Sheet Bar Needs Unfilled

Producers Accommodating Only Regular Customers and Then After Government Needs Are Met—One Mill Sells 10,000 Tons

Cleveland, Dec. 11.—Numerous inquiries for sheet bars remain unsatisfied in the market. One seller disposed of about 10,000 tons of bessemer bars to these buyers and could have sold 20,000 tons more had he been willing. Some producers have adopted the policy of distributing among their regular trade such tonnages as have been left over after large allotments of shell rounds, slabs and other forms in behalf of the government have been entered. Outside buyers are having great difficulty in getting any maker interested in their business. No large additional orders for semifinished steel in behalf of the government have been placed in this district during the past week. One moderate lot of forging material has been inquired for and there are requirements in sight for gun carriages, etc. Some quotations on slabs have been made above the government price, but no purchases have resulted.

Seek Billets and Sheet Bars

Pittsburgh, Dec. 11.—Active demand continues for billets and sheet bars. Mills, however, are well sold up and except in rare instances, where small tonnages are sold, are unable to make offerings for early delivery. Producers of tin plate are particularly anxious to secure sheet bars, but some of them have been unable to fill requirements. The leading interest is selling to its regular trade as far as it is able, but is not making any offerings in the open market. Only limited tonnages of wire rods are being sold, the common grade, either bessemer or basic, going at $65, Pittsburgh, for nearby delivery, while No. 5 wire rods are selling at the regulated price of $57, Pittsburgh. Some makers have no soft rods to sell because of their inability to get steel and are offering only carbon sizes. Manufacturers are selling to regular customers only.

Consider Ordnance Specifications

Chicago, Dec. 11.—Various manufacturers in the middle west who are taking up the production of ordnance for the government are to hold a meeting with steel producers in this city this week. One of the principal subjects to come up for discussion at this meeting will be the transverse tests of steel called for by the specifications. It is reported there has been some difficulty in strictly meeting this specification and some modification may result.

Cold Rolled Strip Improves

Pittsburgh, Dec. 11.—Improvement in demand for cold-rolled strip steel has developed and further business is expected to come to makers after automobile makers and producers of motor accessories have consumed heavy shipments made to them some time ago. Cold-rolled strip steel mills are at present operating at about 60 to 65 per cent capacity but expect to increase this schedule soon.

Shortages in East

Philadelphia, Dec. 10.—The shortage of semifinished steel is becoming more acute. Eastern Pennsylvania mills are getting behind in their deliveries with the result that in many cases consumers do not receive enough steel to take care of their requirements. The shortage is particularly marked in forging billets.

Smaller Drop

Shown in Unfilled Tonnage of Steel Corporation During November

A shrinkage of 112,569 tons in the bookings of the United States Steel Corp. is shown in the report just issued for November. Unfilled orders on Nov. 30 aggregated 8,897,106 tons, as compared with 9,009,675 tons on Oct. 31. Although the decline during the past month was smaller than in October, the decrease was substantial, and was the seventh decline within as many months. The loss in percentage was 1.24. Since April 30, when record unfilled bookings of 12,183,083 tons were attained, the shrinkage has amounted to 3,285,977 tons.

Following is a comparative statement:

Date.	Total.	Change, tonnage.	Change, per cent.
Nov. 30, 1917..	8,897,106	112,569—	1.24—
Oct. 31, 1917..	9,009,675	823,802—	8.37—
Sept. 30, 1917..	9,833,477	573,572—	5.51—
Aug. 31, 1917..	10,407,049	433,115—	4.16—
July 31, 1917..	10,844,164	539,123—	4.74—
June 30, 1917..	11,383,287	503,304—	4.24—
May 31, 1917..	11,886,591	296,492—	2.43—
Apr. 30, 1917..	12,183,083	471,439+	4.02+
Mar. 31, 1917..	11,711,644	134,947+	1.16+
Feb. 28, 1917..	11,576,697	102,643+	0.90+
Jan. 31, 1917..	11,474,054	73,232—	0.64—
Dec. 31, 1916..	11,547,286	488,744+	4.43+
Nov. 30, 1916..	11,058,542	1,043,282+	10.41+
Oct. 31, 1916..	10,015,260	492,676+	5.18+
Sep. 30, 1916..	9,522,584	137,133—	1.42—
Aug. 31, 1916..	9,660,357	66,765+	.69+
July 31, 1916..	9,593,592	46,866—	0.48—
June 30, 1916..	9,640,458	297,340—	3.09—
May 31, 1916..	9,937,798	108,247+	1.11+
Apr. 30, 1916..	9,829,551	498,550+	5.34+

Ask Bars For Implements

Agricultural Machinery Builders Trying to Cover Second Quarter—Priority Orders Enable Mills to Catch Up on Bookings

Chicago, Dec. 11.—Makers of agricultural implements are seeking to place further contracts for soft steel bars to cover their needs for first half of 1918. The situation seems to be that specifications already furnished for bars bought for delivery during the last half of this year will furnish sufficient material to carry most of these manufacturers well through the first quarter but that they will need further tonnage for the second quarter. Mills believe these buyers will be equally well secured if they do not place this additional tonnage until later, and this belief is being acted on. Other consumers apparently are willing to let the matter rest for the present. There is small demand for prompt hard steel bars. Inquiry for next year's supply, however, is coming in strongly but mills are not willing to take contracts until the price has been fixed formally. The experiences of most makers is that all regular contract customers, including agricultural implement makers, gate and bed manufacturers, are seeking contracts for 1918. The quotation continues at 3.25c to 3.50c, Chicago. Consumers of bar iron are not insisting on placing their contracts now for next year, but considerable tonnage is being taken for prompt and first quarter delivery. It is believed this business will be placed gradually.

Awaiting Shell Round Orders

Philadelphia, Dec. 10.—Large additional tonnages of shell rounds are on the verge of being distributed by the committee of the American Iron and Steel institute. It is understood that these will comprise all the shell steel tonnage to be placed for first quarter. Until they are allotted, the mills will continue to go slowly in accepting the commercial steel bar contracts for this position. Although some bar tonnage for first quarter already has been placed, it is not a heavy total. Concrete bars rolled from shell discards, however, continue to be sold freely at 2.90c, Pittsburgh, with extras for carbon and twisting. Momentarily, the demand for iron bars is quiet. The most active buyers are the jobbers, who are taking not only bars but all kinds of iron bar mill products, such as bolts, spikes, etc.

Working Off Old Orders

Cleveland, Dec. 11.—Under the recent priority order governing shipments of steel according to the ultimate use, the mills are able to divert considerable tonnage to certain classes of domestic trade which are not interfered with by this regulation. As a result, old orders are being worked off and in some cases consumers have found that material is coming to them faster than they can handle it, especially since it was anticipated when these orders were placed that they could not be delivered for months. Some of the agricultural implement manufacturers have been in this class. Some of the implement trade in this district continue to talk contracts for next year, but no business of this kind has been taken. Miscellaneous war tonnage is considerable and some good-sized lots remain pending. No official prices yet have been announced on reinforcing bars and there are some indications that the 3.25c, mill, figure without extras for twisting and carbon, may not be the one ultimately adopted.

Steel Bar Demand Small

Pittsburgh, Dec. 11.—Domestic consumers are not making active demands for steel bars, some of them apparently appreciating the fact that mills do not have any tonnages to sell for nearby shipment. Considerable concern is entertained by consumers who have been unable to obtain any tonnages for early delivery.

Wants Many Rivets

Philadelphia, Dec. 11.—The American International Shipbuilding Corp. is in the market for 9,000,000 rivets. Some time ago this interest, as agent for the Emergency Fleet corporation, placed an order with the Buffalo Bolt Co. for 6000 tons of rivets.

Government Buys Shafting

Pittsburgh, Dec. 11.—The government continues to buy shafting while the demand from domestic consumers is rather quiet, particularly on the larger sizes. Sales are made strictly at the government price of 17 per cent off the list, Pittsburgh.

Small Lots of Hoops Sold

Pittsburgh, Dec. 11.—Small lots of hoops ranging from 25 to 150 tons are being sold for nearby delivery at 3.50c, Pittsburgh. While some makers are quoting bands at 2.90c, others are not naming this price in the absence of determination by the institute committee as to what it should be. Only limited lots of bands are understood to have been sold.

200,000 Boxes

Of Tin Plate for Allies Distributed Against 500,000-Box Inquiry

Pittsburgh, Dec. 11.—Tonnages of tin plate for export are reported to have been allotted during the past week among the various producers. Shipping orders for 200,000 base boxes are said to have been given to apply on an inquiry of 500,000 boxes for the entente allies. Producers have taken contracts for first half delivery for their regular trade at the government price of $7.75, base, per box, either open hearth or bessemer. Mills are operating at almost capacity and every effort will be made to maintain output at its highest pitch, in order to take care of the requirements in connection with the food conservation program. In view of the fact that the tin plate capacity of the country is now about 48,000,000 base boxes annually, the supply of tin plate for 1918 will be ample, provided operations are not interrupted. The showing made by the tin plate mills is rather remarkable in view of the shortage of steel cars, pig tin and sulphuric acid. There has also been difficulty in obtaining palm oil.

Pipe Shops Down

Because of the Lack of Orders—Tube Mills Active

Chicago, Dec. 11.—Demand for cast iron pipe has fallen to almost nothing and pipe shops are almost at the end of their order books. Some shops already have been closed from lack of business. More difficulty is being experienced on account of poor fuel and small supply of pig iron and on the whole pipe making is an unsatisfactory undertaking at present. Some cities with a small balance remaining in their water funds are seeking to buy pipe for delivery next year in order to utilize this money, which may give a little business for the early winter. Opening bids on 5000 tons of large-sized pipe at Winnipeg have been postponed again, this time to Dec. 20. Some changes have been made in the specifications for Jackson, Mich., where bids were opened recently, but awards have not been made.

Ask Heavy Pipe Tonnages

Pittsburgh, Dec. 11.—The Philadelphia Co. is understood not to have

closed for the steel and wrought iron pipe tonnages for which it put out inquiries last week. The steel pipe inquiry involves 375 miles of lap-weld grades, totaling about 20,000 tons, of sizes ranging from 2 inches to 16 inches, while that for iron pipe involves about 9000 tons of sizes ranging from 1½ to 10¼ inches. The steel pipe tonnage in detail follows: Fifteen to 18 miles of 10-inch casing, 1700 tons; 35 to 40 miles of 8¼-inch casing, 2400 tons; 60 to 65 miles of 6⅝-inch casing, 2500 tons; 10 miles of 5 3/16-inch casing, 425 tons; 15 to 18 miles of 3-inch tubing, 400 tons; 80 to 85 miles of 2-inch tubing, 900 tons; 40 miles of 4-inch line pipe, 1100 tons; 55 miles of 6-inch line pipe, 2800 tons; 20 miles of 8-inch line pipe, 1200 tons; 15 miles of 10-inch line pipe, 1300 tons; 25 miles of 12-inch pipe, 2700 tons; and 15 miles of 16-inch line pipe, 2800 tons.

Soil Pipe Plant Closes

Birmingham, Ala., Dec. 11.—Every foundry and machine shop in the Birmingham district is working to full capacity save the pipe plants. The soil pipe market is still slow and the plant at Bessemer has been shut down indefinitely. While considerable pig iron is being melted, the cast-iron pipe plants are in need of orders. Reports are current that southern pipe shops have taken further contracts from the government for shipment to the Panama canal zone.

Buyers Not Satisfied

Boston, Dec. 10.—The local situation in warehouse products still is unsettled, for now that the government has acted on prices, buyers believe they should be able to secure supplies on a lower basis. The jobbers, with a few exceptions, on the other hand, feel the government schedules were not fixed with any intention of making them sell at a loss. That is what the government-fixed prices mean, they say. Instead of following instructions, the jobbers are inclined to hold prices at a level where they can at least get out even. They are still drawing on contracts made much above current mill quotations, and since the mills are not accepting new business freely at the lower prices, there is not much chance for the jobbers to average down their costs. Warehouse prices, which are largely nominal, follow: Plates, 6.75c; structural shapes, 5 to 5.50c; steel bars, small, 5c; shrapnel, 6c; iron bars, 5c; 28 gage black sheets, 7.50c; 28-gage galvanized sheets, 8.25; 10-gage blue annealed sheets, 6.85c.

Sheet Buyers Rush Inquiry

Hear Reports Prices May Be Announced—Mills Selling Carefully in View of Government Tonnage

Youngstown, O., Dec. 12.—Many consumers of sheets seem to be under an impression fostered by numerous reports in widely scattered centers, that the price of sheets may show a higher level after the government acts on the present fixed schedule, Jan. 1. One salesmanager in this district stated that in two instances letters were received from customers who because of the rumor, wanted to place large tonnages for delivery over next year. Increased inquiry has resulted from the report, although little business has been placed. The general opinion prevalent among producers is that sheet prices after Jan. 1 will show no variation from the present level. Manufacturers of sheets are just beginning to shed the feeling of uncertainty that has gripped them since the price announcement and to settle down to normal conditions. Were the government to make a further reduction or an advance in sheet prices the first of the year, producers believe it would cause a reproduction of the former uncertainty and consequent upsetting of business. No governmental or allied allotments of sheets have come into the valley the past week, although the mills already have fairly large unfilled tonnages. Producers expect large additional allotments of governmental business later and are notifying the domestic trade to that effect when contracts are made. One producer has on his books export tonnage representing about 60 per cent of the total, mostly in blue annealed and black that was contracted for about three weeks ago. The material is being forwarded daily and will continue as long as no embargo blocks the exportation. This is not expected since a recent announcement was voiced by the government that a fairly large leeway would be given to shipments to the allies.

Eastern Offerings Light

Philadelphia, Dec. 10.—Sheet offerings at present are almost entirely absent from the market. The leading eastern maker has entered, subject to government requisitions, the first quarter requirements of regular customers at 4.25c, Pittsburgh, or 4.435c, Philadelphia, and now is out of the market. Other producers are in doubt as to what ingot tonnage they will have available for sheets, after the government has placed orders for various forms of steel, and beyond taking orders from regular customers here and there, are doing nothing.

Demand for Sheets Heavy

Pittsburgh, Dec. 11.—Heavy demand for sheets is being made by domestic consumers and large tonnages have also been taken recently for government use. Mills have allotted tonnages to their regular trade for first half delivery for blue annealed and black sheets, while for galvanized sheets delivery is restricted to first quarter. The output of sheet mills is estimated at from 60 to 70 per cent, the curtailment being due to a shortage of labor, cars and steel. Tonnages being taken are closed at the government figures of 5c, Pittsburgh, for black sheets No. 28, 4.25c for blue annealed No. 10 and 6.25c for galvanized sheets No. 28.

New Inquiry Heavy

Chicago, Dec. 11.—The leading sheetmaker in this district is out of the market and is not taking further business until it can determine what tonnage it has available for sale. Inquiries are being received in large volume and consumers apparently are in need of much material. Demand for sheets to be exported is especially heavy. Galvanized leads in this inquiry.

Japan Needs Steel

Japanese shipbuilders are greatly hampered in their activities by the United States' embargo on steel. Baron Shibusawa, one of Japan's most prominent financiers, recently telegraphed to Judge E. H. Gary calling attention to the fact that Japanese shipbuilders have contracted for about 400,000 tons of ship steel in America, to be delivered in 18 months, and that unless the materials can be obtained according to contract, they will be forced to abrogate their present contracts for ships. Baron Shibusawa expressed a wish that an immediate way may be found of clearing the situation because of the probability that the majority of the ships built with these materials will become the property of the entente powers, or if not, be turned over for their use. In either case the allied governments would be benefited

Ice Stops Lake Navigation

Ore Shipping Season Closes—1918 Prices to be Set Soon —Increases Expected to Offset Higher Costs

Cleveland, Dec. 11.—Ice is blocking navigation on the Great Lakes and iron ore transportation is practically at an end. A number of ore-carrying ships are slowly breaking their way through the ice and will deliver cargoes at lower lake ports while some ore remains to be loaded at Escanaba, Mich. The docks at the head of the lakes have shipped their last ore. The season's shipments are surprisingly large and will range from 64,000,000 tons to 65,000,000 tons against 66,658,466 tons in 1916.

Ore prices for 1918 are being discussed by producers and consumers but, with the exception of contracts for special grades, practically no sales have been made. An adjustment of ore prices probably will be made by government officials and ore operators during the next two weeks. An increase over 1917 prices sufficient to care for increased labor and transportation costs is predicted. On such a basis, this increase, it is estimated by some operators, will amount to about 25 cents a ton, bringing Mesabi nonbessemer up to $5.30 a ton and old range bessemer to $6.20 a ton.

Ore receipts at Lake Erie ports in November amounted to 5,775,181 tons, out of total shipments during the month of 7,333,828 tons. The detailed record follows:

Port	Gross tons
Buffalo and Port Colborne	1,004,591
Erie	376,504
Conneaut	917,830
Ashtabula	1,241,743
Fairport	210,193
Cleveland	997,523
Lorain	417,861
Huron	219,441
Toledo	326,914
Detroit	62,581
Total	5,775,181

Former Prices

Continue in Ferromanganese Due to Ore Difficulty and Cut Output

New York, Dec. 11.—Prices on ferromanganese are hardening rapidly due to two causes. The first is the difficulty in obtaining ships for bringing in foreign manganese ore. The second is a temporary decrease in production of ferromanganese, which forces some sellers out of the market for the present. Several sales were made the latter part of last week around $245, but the bed rock minimum now appears to be $250, and the market now may be quoted at $250 to $255, delivered. A number of inquiries are out but none of these are large.

Spiegeleisen also is firmer and nothing less than $60 now can be done. Sales for this year have been made during the past week at $60 to $61.50, furnace, and this range now represents the market. Demand is rather quiet.

Inquiries are out for some 2000 to 3000 tons of 50 per cent ferrosilicon for first half. None of this business so far has been closed, but the quotations made generally range from $160 to $170, delivered. There has been a fair amount of spot and nearby buying, but only in carload lots. The producers generally have sold about all they can spare for nearby shipment, which now is very hard to get. The spot and nearby market may be quoted around $175, delivered.

Ferrosilicon is Wanted

Pittsburgh, Dec. 11.—Few inquiries have come out during the past week for 50 per cent ferrosilicon for prompt delivery. A steelmaker in the Mahoning valley is seeking 1000 tons for first quarter delivery, and is understood to have offered tentatively $145, furnace, but the lowest quotation made is said to have been $150. An extremely limited tonnage of this grade was sold last week at $205, furnace, although this, of course, does not represent the regular market. Some makers are asking $170, Pittsburgh, for this delivery and contracts are reported to have been made at that figure, which compares with the range of $150 to $160, Pittsburgh, that has been prevailing. Fifty per cent ferrosilicon for prompt delivery is quoted at $170, Pittsburgh. Inquiry for different grades of bessemer ferrosilicon is quiet. Makers are well sold up for the remainder of the year. The market for ferromanganese also is quiet.

Ferromanganese is Scarce

Chicago, Dec. 11.—Ferromanganese from the local producer is scarce but some tonnage can be taken for delivery from March to June with the possibility of small tonnages being placed for February delivery. The quotation remains steady at $250, furnace.

Chicago Ferro Firm

Chicago, Dec. 4.—Ferromanganese from the Chicago stack is being held firmly at $250, furnace, but comparatively little is being sold, as the production until the middle of next year has been practically covered.

Taxing Plate Mill Output

War Demands Gradually Choking Off Requirements of Other Consumers—Makers Obliged to Reject Tonnage for Cars

Philadelphia, Dec. 10.—Additional heavy tonnages of plates to be shipped to fabricators who have contracts for ship steel for the American International Shipbuilding Corp. have been placed with eastern Pennsylvania mills during the past week. Further tonnage is to be placed this week. Inquiry for plates continues active from all classes of consumers. One of the largest inquiries during the week was from a car manufacturer who is building cars for the government. Despite this fact, the tonnage could not be placed since plate mills have all they can do to make deliveries on the contracts so far distributed by the Emergency Fleet corporation.

Domestic Buying is Absent

Pittsburgh, Dec. 11.—No domestic buying of plates is taking place in the Pittsburgh district, except in instances where odd lots are sold. Government orders, involving heavy tonnages, have been placed and the mills have little to offer in the open market. Car builders are succeeding in obtaining sufficient supplies of plates for the present, and a large portion of their work is for the government. One maker in the Pittsburgh district is producing from 70 to 80 cars a day, about 30 of which are to apply on government orders. The remainder will go to domestic railroads, the rolling stock of which will be used for transporting government war material.

Government Buys Plates

Cleveland, Dec. 11.—A large order for 3/16-inch plates for government purposes which has been talked about recently is understood to have been placed. Local mills have received tonnage which is reported to be a portion of this business. The original amount of this requirement was said

to be 20,000 tons. It is presumed to be in connection with mine and buoy work. All platemakers in this district now are quoting more consistently the fixed price of 3.25c, Pittsburgh, although some plants are being put to hardship because they are working up high-priced slabs. In some cases, up to 4c, Pittsburgh, has been named. Eastern makers who have been selling universal plates at 3.33c, mill, in this district are no longer able to furnish early shipment. Deliveries now range from three to four months. No contract has been awarded for the 420 watertube boilers for Emergency Fleet corporation boats. A meeting of 14 boiler manufacturers is being held in Washington this week in connection with this matter.

Ship Tonnage Placed

Chicago, Dec. 11.—Placing of plate tonnages with mills to be furnished to fabricating shops making material for the Emergency Fleet corporation ships continues. The leading independent maker in this district has received within the last few days approximately 5000 tons, of which about 90 per cent is plates. This is to be furnished promptly. Export demand for plates is heavy, although it is difficult to see why this should be so in the face of the embargo against such shipments.

Small Rail Tonnage Sold

Pittsburgh, Dec. 11.—Limited tonnages of light rails for early delivery have been sold by makers in the Pittsburgh district during the past week at the government price of 3c, Pittsburgh. Lumber companies in the south have been buying. Some producers are not taking tonnages of light rails while others are selling only limited lots to regular customers. Railroads have put out inquiries for small tonnages of standard rails for delivery in 1919, but manufacturers are not yet quoting for that delivery.

Steel Company Buys Rails

Cleveland, Dec. 12.—The Brier Hill Steel Co., Youngstown, has been the purchaser of 1500 tons of 85-pound rails, dividing this among several mills.

Selling Light Rails

Chicago, Dec. 11.—Makers of light steel rails continue to sell steadily and deliveries for the most part are about six months distant. New business is practically equal to shipments and business remains fairly steady.

War Steel Fills Market

Virtually All Structural Material Business Covers Government Undertakings—New Ohio Ordnance Plant Calls for 7000 Tons

Cleveland, Dec. 11.—Some large orders for structural shapes are coming into the market, principally in connection with government work. Little activity has been displayed in building operations of small size, but several large projects, now pending, have been initiated. Requirements for the extension of the Russell Wheel & Foundry Co., Detroit, involve 3500 tons; those for the Morgan Engineering Co., Alliance, O., 7000 tons and for the Cleveland municipal electric light plant, for which revised bids are being taken, 900 tons are wanted.

More Ship Steel Closed

Philadelphia, Dec. 10.—The American International Shipbuilding Corp., as agent of the Emergency Fleet corporation, has placed contracts, it is understood, for the fabricated steel for 25 additional 7500-ton vessels, making 50 for which it now has provided the steel. This interest is on the verge of asking for bids for the steel for 70 troopships, each of 8000 tons deadweight, as reported last week. This is practically the only business before fabricators. Plain structural shapes continue to be sold in small tonnages at 3c, Pittsburgh, for mill delivery, with a differential of 10 cents per 100 pounds for special sections, and of 50 cents per 100 pounds for shipment out of stock.

Domestic Market Very Quiet

Pittsburgh, Dec. 11.—Fabricators report that inquiries coming from domestic consumers for structural material are extremely limited. Tonnages taken for this class of business is almost negligible, and some fabricators report that they are unable to obtain shapes for private use at the government price of 3c, Pittsburgh. Government orders are heavy and take up a great portion of the capacity of structural mills.

Industrial Building Leads

Chicago, Dec. 11.—Contracts were placed during the past week for about 1400 tons of structural fabricating material in the west. This involves five projects, all of which are industrial or for public use. The largest tonnage is 750 tons. Some tonnages of structural shapes has been placed with steelmakers to be furnished to fabricating shops preparing material for the Emergency Fleet corporation.

CONTRACTS AWARDED

Pier shed for the board of commissioners, Port of New Orleans, 750 tons, to the Virginia Bridge & Iron Co.

Steelwork for refining building for the Peoples Gas, Light & Coke Co., Chicago, Ill., 265 tons, to the South Halsted Street Iron Works.

Steel building over Mould yard, for the Wisconsin Steel Works, South Chicago, Ill., 140 tons.

Structural steel for rigger shed, for the Ohio Copper Co., Larke, Utah, 125 tons, to the Minneapolis Steel & Machinery Co.

Two 77-foot 8-inch deck plate girder spans for the Chicago, Rock Island & Pacific Railway Co., Romero, Tex., 110 tons, to the American Bridge Co.

Ordnance plant for the Morgan Engineering Co., Alliance, O., 7000 tons, general contract to the George A. Fuller Co., New York.

CONTRACTS PENDING

Plant for Russell Wheel & Foundry Co., Detroit, 3500 tons; bids being taken.

Cleveland municipal electric light plant, 900 tons; revised bids being taken.

Bridge for southern railroad, 300 tons, bids being taken.

Bridge for Pennsylvania railroad, 200 tons, bids being taken.

Highway bridge at Red Bank, N. J., 200 tons, all bids rejected.

Extensions to buildings 105 and 112, Washington navy yard, 1500 to 1600 tons, bids to be opened Dec. 17.

Active Demand

For Wire Products But Supplies Limited—Production Cut Down

Cleveland, Dec. 12.—Wiremakers have been active sellers of prompt delivery material the past week. Jobbers whose stocks of wire nails and fencing had been depleted, now are replenishing and sales into this district have been heavier than in months, all at agreed prices.

Wire Market Active

Pittsburgh, Dec. 11.—Makers of wire report that the market is active, specifications and inquiries being fairly brisk. With the producers it is a question of obtaining steel rather than one of getting business. Contracts for manufacturers' wire for nearby and first quarter have been closed.

The Jones & Laughlin Steel Co. has received an order for 10,000 kegs of wire nails from the Emergency Fleet corporation for the American International Shipbuilding Corp., Philadelphia.

Believe Prices Wont Be Revised

No Definite Announcement Yet Made of Results of Washington Conference Between Iron and Steel Producers and Government Representatives—Promptly Filling War Requirements Takes Precedence—Cost Report to be Filed

Washington, Dec. 11.—Present iron and steel prices will be reaffirmed Jan. 1, according to the belief which prevails here following a conference of government and steel officials on Monday. The subject of prices, it is understood, was not so much discussed as were general conditions affecting labor and the government's requirements of steel for the production of ships, munitions, etc., and other essentials.

It is assumed that anything which may be done in line of revision of prices will follow the submission of special cost report of the federal trade commission to the President and war industries board this or next week. Later steel men may be recalled but this it is believed will not be necessary. The federal trade commission Friday will receive in hearing or writing the views of the industry relative to standardizing cost systems and reports. In discussing labor at the conference the effect of the alien enemy act was shown to be a big new factor.

Those in Attendance

Among the iron and steel men present at the conference were: Chairman E. H. Gary of the Steel corporation; E. S. A. Clarke, president of the Lackawanna Steel Corp.; James A. Farrell, president of the Steel corporation; A. C. Dinkey, president of the Midvale Steel & Ordnance Co.; W. J. Filbert, comptroller of the Steel corporation; John A. Topping, chairman of the Republic Iron & Steel Co.; C. M. Schwab, chairman of the Bethlehem Steel Co.; E. W. Grace, president of the Bethlehem Steel Co.; Carl G. Roebling, president of John A. Roebling Sons Co.; A. F. Huston, president of Lukens Steel Co.; Willis King of the Jones & Laughlin Steel Co.; F. H. Gordon, general manager of sales of the Lukens Steel Co.; James A. Burden of the Burden Iron Co.; F. N. Beegle of the Union Drawn Steel Co.; James Bonner, in charge of the American Iron and Steel institute's activities at Washington; W. S. Horner of Pittsburgh, president of National Association of Sheet and Tin Plate Manufacturers; Eli P. Joseph and W. Vernon Phillips, representing the scrap iron and steel trade.

The coke men were represented by Roy A. Rainey and Scott Stewart. The government representatives were Messrs. Willard, Lovett, Baruch, Brookings, Frayne, Pierce, Legg, Replogle and Blauvelt. Messrs. Davies, Walker and Wooster of the federal trade commission also attended.

Report Denied

That Coke Contracts Were to be Reduced to Fixed Prices

Washington, Dec. 11. (By wire.)—A report that Fuel Administrator Garfield has ordered all coke contracts be filled at the government price schedule is unconfirmed. It was stated authoritatively today that the government contemplates forcing the use of coke manufactured nearest to the consuming plant regardless of the oven or by-product plant. This plan to save cars is likely to go through if it can be devised whereby a uniform grade of coke is assured to steelmakers. No change in coke prices Jan. 1 now is anticipated.

Many Plants

Of American Steel & Wire Forced Down by Coal Shortage

Many manufacturing concerns in the Cleveland district have had to close down on account of the coal and coke shortage. Among the concerns most affected is the American Steel & Wire Co. All steel and wire departments, including the Newburg Steel, Newburg Wire, Consolidated, American, H. P., and Cuyahoga works are idle, lack of coal being the cause. The Emma furnace was banked last week. Two furnaces of the central group are operating at reduced blast while "C" furnace was banked Monday. Furnace "B" has been completely relined and as soon as an adequate supply of coke is assured will be blown in.

Makes New Regulations

The Massachusetts public service commission has issued an order providing that every railroad corporation operating in the state shall hereafter equip its trains for use in case of accident with the following train tools: Two car replacers, two lifting jacks, 24 inches or more in height and not less than 25 tons capacity each, two steel crowbars, two sharp steel axes, and one each of steel pinch bars, steel claw bar, 8-pound spike hammer, wire cable for hauling cars and a steel drift for removing rivets. Under the provisions of the order, the railroads also are obliged to equip each car of every passenger train which is owned or regularly used with one each of each of the following articles: Sharp steel ax, steel or wrought iron sledge hammer not less than five pounds, a 30-inch steel crowbar and a steel saw.

Plants Again Shut Down

Youngstown, O., Dec. 11.—Iron and steel production in this territory again has been reduced temporarily due to an insufficient supply of coal which has been rendered more acute by storm conditions. The Youngstown Sheet & Tube Co. has been obliged to reduce its coke output 25 per cent and has slowed down other departments correspondingly. The Brown-Bonnell finishing mill and the bessemer plant of the Republic Iron & Steel Co. have been suspended. It was only recently that these companies resumed operations of various departments after having been idle for about 10 days.

Erects Malleable Plant

The St. Louis Car Co., St. Louis, manufacturer of trolley cars, has erected a small malleable iron foundry the product of which is used by this plant. Edward B. Meissner, assistant to the president, is in charge of the foundry.

Dinner is Tendered

Officials of the American Steel Export Co. Thanksgiving eve tendered a dinner at the Waldorf-Astoria, New York, to E. W. Ames and A. G. Dowden, of the corporation, who are about to sail for Japan on a business trip. The menu was in keeping with the occasion, cucumber salad being known as cone head rivets and breast of chicken as one-pass cold rolled sheets, galvanized and such titles as sulphuric

acid, benzol and spikes appeared appropriately. The table had its entire center made up as a section of Japanese terrain, with several miniature lakes and bridges and roads here and there. Stunted shrubbery and snow-capped Fujiyama in the distance completed the picture. About 25 were present.

May Discard Steel

Reinforced concrete is under contemplation by the public service commission in New York, as a substitute for steel in subway and rapid transit construction. Because of the inability of fabricators to make satisfactory bids on the steel for section No. 3 of the Culver rapid transit system in Brooklyn two or three months ago, it has been decided to experiment with a reinforced concrete structure on this section. If the work proceeds satisfactorily, the plan is to use concrete in all places where it appears that no steel will be speedily obtainable.

Succeeds Partnership

Bernard H. Prack, Pittsburgh, industrial architect and engineer, will conduct the business as an individual, which was formerly carried on under the firm name of Prack & Perrine. Present offices will be continued at 801-4 Keystone building, Pittsburgh, and at 808 Lumsden building, Toronto, Ont. Mr. Prack has charge of the erection of the Westinghouse Electric & Mfg. Co.'s new malleable iron plant at Cleveland.

Remodeling Furnace

P. J. Brown Construction Co., Cleveland, has taken a contract for remodeling the Top furnace of the Wheeling Steel & Iron Co., Wheeling, W. Va. The furnace, 80 x 18 feet, will undergo a complete relining and the Crooke and three Massick hot blast stoves will be redesigned for two-pass operations. Minor changes will also be made to the four Babcock & Wilcox boilers. The furnace was constructed in 1874 and rebuilt in 1894.

To Build Coke Plant

The American Coke & Chemical Co., through one of its subsidiaries, it is reported, soon will commence the erection of a large by-product coke plant at East St. Louis, Ill. The cost of the contemplated plant will be about $10,000,000.

Plans Big Ordnance Plant

Morgan Engineering Co. Begins Huge Extension Program Upon Receipt of Gun Mount Contract—Many Tools Needed

A GOVERNMENT contract for gun mounts signed last Saturday in Washington, has lead to the establishment of a record for rapid consummation of plans for the erection by the Morgan Engineering Co., Alliance, O., of a great plant for the manufacture of ordnance. Two days after the formal closing of the business preliminary construction work on the first of nine new buildings which will constitute the new plant had been begun by the George A. Fuller Co., New York, the general contractors. These new buildings, it is planned, will be completed by April 1, and will add approximately 500,000 square feet of floor space to the present works.

The plant is to occupy a triangular section of land now owned by the Morgan company, and located alongside the Cleveland & Pittsburgh railroad. The buildings will be of steel, concrete and glass. Asphalt floors are to be provided. The extensions and their dimensions include: Erecting shop, 1000 x 90 x 50 feet; six machine shops ranging in length from 300 to 1000 feet, with widths varying from 50 to 90 feet; and an office and power plant. Orders have been placed for the construction steel, priority certificates having been obtained, and deliveries will commence in about two months. Part of the equipment needs for the new plant are incorporated in a list of 271 machine tools. These, now in the market, are about one-half the tools which will be needed to completely equip the new buildings. In addition to the machine tools, the present plans call for 21 electric traveling cranes with capacities ranging from 25 to 125 tons. Representatives of the Morgan company today are searching for equipment, under government authority to commandeer any machine tools found on wharves or in railroad freight terminals. No difficulty is anticipated by officials of the company in obtaining necessary equipment before April 1, so that it is thought it will not be necessary to resort to any commandeering. Officials of the company have been reticent to discuss the cost of the buildings planned, but it is known that, exclusive of equipment, the total expenditure will amount to several million dollars. The initial government contract received is expected to be followed by additional orders of the same kind. In the beginning the activities of the plant will be confined to the manufacture of gun carriages of the 8, 10, 12, 14 and 16-inch type. Later the construction not only of carriages for the 16-inch disappearing guns, but the guns themselves also is contemplated. Eventually it is understood all kinds of ordnance will be manufactured.

Canadian Shellmaker Gets American Contract

The Toronto plants of the Canadian Fairbanks-Morse, Ltd., have received an order from the American government for 1,500,000 seventy-five-millimeter shells, such as have been ordered from a number of Canadian firms within the past few months. The plants of the company are now being put in order to turn out the new order as expeditiously as possible. The company also is engaged upon an order for 300,000 six-inch shells for the Canadian government.

Holds Sales Meeting

A two-day meeting of salesmen and branch office managers of the Youngstown Sheet & Tube Co., was held last week at the home offices in Youngstown. It was attended by representatives from each district covered by the company. An inspection tour of the works enabled the men to view the $16,000,000 new construction program now partially completed, including the new plate mill which is being rushed to supply the government's urgent needs. Addresses by executives were delivered, detailing the company's effort to supply steel to the government and the allies for war purposes; in Liberty loans, investments, etc. Discussion of sales problems by salesmen and department heads occupied the second day. The conference closed with a dinner at the Hotel Ohio.

To Ship Rails Abroad

Fifty-seven miles of railroad between Canisteo, N. Y., and Shinglehouse, Pa., known as the New York & Pennsylvania railroad, has been bought by the Benjamin Iron & Steel Co., Buffalo, at a reported price of between $350,000 and $400,000. The road will be scrapped and the rails sold abroad.

More Embargoes

Being Declared Because of Storm Tie Up Pittsburgh Tonnage

Pittsburgh, Dec. 12. (By wire.)—With more embargoes being declared by the railroads, traffic conditions are growing worse. The latest embargo to go into effect is that of the Pittsburgh & Lake Erie railroad. This will not accept any connecting line's shipments of freight of any description destined to points on or by way of the New York Central junction Ohio, Cleveland and east. Embargoes are being declared on account of serious accumulation due to increased congested conditions of traffic as the result of cold weather. Blast furnaces are making urgent but futile appeals for coke and further banking seems to be inevitable.

Many Inquiries

For Pig Iron Bring Small Results in Boston Territory

Boston, Dec. 10.—The Boston pig iron market would be quite active if the metal were available, for a good many consumers have underestimated their needs and now are trying to make good this deficiency. The inquiries are both numerous and large and while nearby and first quarter iron are most sought there are calls for the last half of 1918. It cannot be said that the furnaces are keen for orders beyond the first half of next year, in view of the unsatisfactory operating conditions. The coke situation continues bothersome not only from the viewpoint of supply, but also of quality. Local melters still are urging the delivery of metal on old contracts, but they are not meeting with much success for the railroad situation is worse rather than better. Few, if any, shipments are moving out of Virginia these days except for government business. The foundries not working on government orders cannot get iron from Virginia and supplying their needs in other directions is not simple owing to the sold-up condition of producers and the transportation difficulties.

Inquiries cover all grades, but it is observed that low-grade iron is being taken in a good many instances where better material is wanted, but cannot be obtained. One house agent reports an order for 4000 tons, which when submitted to the principal was scaled to 600 tons and that amount was allowed because the buyer was a regular customer and a government "envelope" accompanied the order. There has been some contracting for coke for first half delivery on the government price basis.

Open Shops

May Be Operated by Employers, Say the Supreme Court

In decisions rendered Monday, the United States Supreme Court recognized the right of employers to operate their plants as open shops. The court further recognized the right of employers to prevent conspiracies to bring nonunion employes into labor organizations, although the privilege of workmen to organize for lawful purposes was reaffirmed.

The opinions were rendered in the cases of the Hitchman Coal & Coke Co. and the Eagle Glass Mfg. Co., of West Virginia, the court deciding that both restraining the United Mine Workers' and the Flint Glass Makers' union from attempting to organize their employes. In the Hitchman case, the court held that officials of the miners' union "deliberately and advisedly selected that method of enlarging the union membership which would inflict injury" upon the company and its loyal employes and declared that the "conduct in so doing was unjust and malicious".

Cancels Last Warrant

The American Warrant Co. has cancelled its last warrant calling for iron in the store on merchant yards, according to the Matthew Addy Co. in its weekly market report of Dec. 8. The significance of this situation, says the report, is that the stock of iron which had been piled as a reserve of the industry has been exhausted and the country now is dependent for the metal it uses on the daily output of the furnaces.

Freight rates on pig iron from Dunbar, Josephine and Scottdale, Pa., to Pittsburgh, were increased 10 cents a ton Dec. 5. The new rate from Dunbar and Scottdale is $1, while from Josephine, 90 cents. The rate on ferromanganese and spiegeleisen from Dunbar was increased 15 cents a ton to $1.15. As the result of the increased rate from Dunbar and Scottdale, it is now 5 cents a ton higher than the rate of 95 cents from the valleys.

The Nagle Steel Co., Pottstown, Pa., is installing a large set of straightening rolls at its Seyfert plant.

The Non-Ferrous Metals

Copper Lead Spelter Tin

New York, Dec. 11.—A meeting of representatives of leading copper producing companies with the war industries board is scheduled for next Friday, Dec. 14 and interest in the metal trade centers on this approaching meeting. It is announced that this meeting will be held for the discussion of revision of copper prices, the original agreement having been made to extend only four months, or until Jan. 1. It is understood that producers will ask for an advance from 23.50c to 25c. The marketing of copper in less than carload lots at 23.50c plus 5 per cent commission is proceeding steadily and there seems to be enough copper on hand to supply the wants of the small consumers.

Today is fixed for the subcommittee on tin of the American Iron and Steel institute to take over officially the distribution of tin supplies in this country. Arrivals of tin so far this month in this country have not totaled quite 500 tons and such metal as can be picked up is commanding prices 50 per cent higher than the record level reached in this market prior to this year. Small consumers having important government contracts and needing tin to complete them are being assisted by larger consumers who are drawing from their safety stocks and offering the metal at the same price at which they can replace it by buying futures.

The lead market has been inactive the past week, consumers seeming well covered as the result of the heavy buying early in November. Outside sellers are not pressing the market, but it is probable they would, in some cases, accept 6.25c, St. Louis, for prompt shipment, which compares with 6.-17½c quoted by the leading interest.

Prime western spelter continues a drug on the market. The market has declined to about 7.50c, St. Louis, for prompt shipment, and about 7.62½c for first quarter shipment. Intermediate grades are nominally quoted 10c, St. Louis, and high grades nominally 13.50c, St. Louis.

Some activity in antimony was noted last week, but this has subsided and interest has dwindled. Chinese and Japanese brands for spot delivery, are quoted 15c to 15.25c, duty paid.

The metals division of the National Association of Waste Material Dealers will hold a meeting next Tuesday afternoon at the Astor. A committee from this division is representing the old metals trade in negotiating with the war industries board. Copper scrap is included in the copper price understanding and most dealers have signed pledges agreeing not to sell material at above 23.50c. However, some sales still are being made, despite the efforts of the committee, the dealings being conducted quietly and the extra price disguised under the nomenclature "labor" or "commission".

Modern Steel Plant Power House

Exhaust Steam from Blowing Engines Used to Operate a Mixed-Pressure Turbine Connected to a 2500-Kilowatt Generator

Fig. 1—Front View of the Boilers Looking North—Gas Burners Are Shown in the Foreground

AT MANY blast furnace plants throughout the country, the various prime movers, including blowing engines, pumps, generators, etc., are housed separately. Why this method of construction has been followed so closely heretofore is a matter of conjecture, but it is reasonable to suppose it will be crowded to the background in later day practice. Economy is effected by having power units under one roof because less air, steam and water piping is required and less space is needed for the building site.

Among the first iron and steel firms to consider the advantages offered by an all-unit power plant were Corrigan, McKinney & Co., Cleveland. This firm, in order to supply air for two new blast furnaces and current for the steel plant and coke-oven departments which were described in the Nov. 15 issue of THE IRON TRADE REVIEW, recently completed what is said to be the most up-to-date power plant operated in this country by any iron and steel concern. The plant is located near the blast furnaces in order that the waste gases can be used for generating steam which in turn is utilized for driving the blowers, generators and part of the pump equipment. All other prime movers are electrically operated.

All equipment such as blowing engines, electric generators, pumps, purifying plant, boilers and auxiliaries is housed in a brick building, 408 feet long, 76 feet wide, and 127 feet high. Reinforced concrete is used for the foundation and is strengthened by hardwood piling, which is driven 35 feet into the ground and gives a safe working load of 50,000 pounds per square inch. The outer walls, 17 inches thick at the first floor, are constructed of rough, red brick, 8½ x 4 x 3½ inches, backed by standard brick, 8½ x 3¾ x 2¼ inches. A double course of two-ply, tarred roofing felt lies between the foundation and outside walls. Hard gray sandstone is used for all coping. As shown in Fig. 2, the engine room floors are constructed of 1-inch, smooth-finished concrete, laid off in blocks, 30 inches square. Brown, glazed brick forms a border, 6 feet high, blending with the white upper walls and ceiling. Interior lighting is softened by glazed glass which is ribbed in the steel window frames of the forebays and east elevation. A 12¾-inch wall extends through the building, partitioning the boiler room from the engine room.

The steam-generating equipment consists of fifteen 823-horsepower boilers operating at a pressure of 250 pounds per square inch. Each of the boilers which were made by the Babcock & Wilcox Co., New York, contains 630 3½-inch tubes. Steam generated in these tubes passes to three 42-inch drums which discharge through an 8-inch line to a superheater. This heater is designed to increase the temperature from 125 to 150 degrees, Fahr., when the decrement in the pressure is not greater than from 5 to 8 pounds per square inch. The superheated steam passes into a main header in the rear of the boilers.

Each boiler is equipped with a soot blower, consisting of seven units and permanently set in the boiler wall. Four of the units are of extra-heavy steel pipe insulated with aluminum; two are of plain pipe and revolve; and one is automatic. All units not within immediate reach from the floor are operated by sheaves and chains. Each boiler is fitted with four safety valves and a high and low water alarm. The amount of draft in the combustion chamber and in the last pass of the boiler is indicated by a differential, sloping draft gage. A steam pressure gage registering to 400 pounds per square inch, and a steam flow meter are standard equipment on each boiler.

Five of the boilers are equipped to burn coal and the other 10 are fired with blast furnace gas. The coal-fired units have chain grate stokers and double flat arches, one each for ignition and combustion.

Coal is brought to the plant in hopper cars which empty into a hopper on the outside of the building. The hopper feeds onto a cast iron

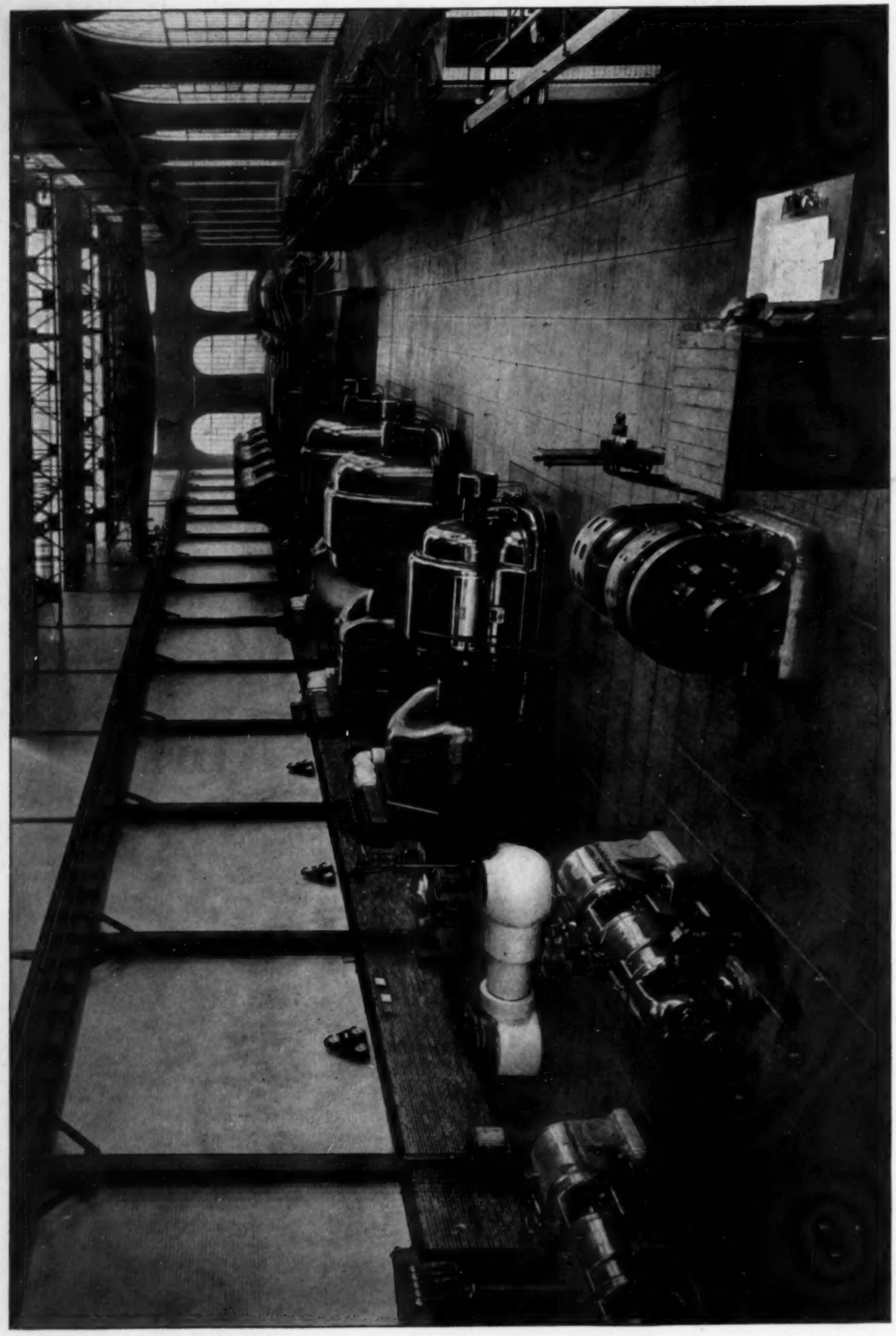


FIG. 2—MAIN FLOOR OF CORRIGAN, McKINNEY & CO.'S POWER PLANT SHOWING THE TURBINE-DRIVEN GENERATORS, BLOWING ENGINES, EXCITERS, MOTOR-GENERATOR SET AND OIL SWITCH COMPARTMENTS (TO THE RIGHT)

pocket conveyor which discharges into a crusher operating through double shrouded gears by a 25-horsepower motor. The rolls, 24 x 30 inches, are equipped with removable chilled teeth and cast iron sections which are bolted to heavy cast iron drums. The floating roll is fitted with a toggle spring release which gives a maximum pressure between rolls when in normal operating position. If any iron or hard material finds its way into the crusher, no harm is done, since the pressure between the rolls decreases as the rolls separate.

After passing through the crusher, the coal is fed into a cup elevator through it is stored in a secondary hopper which discharges into railroad cars below.

Blast furnace gas for the 10 gas-fired boilers is delivered to the power house in a common main and is distributed to individual boiler manifolds which discharge through separate legs to four burners. The air for combustion enters through four 5-inch ports and is regulated by a lever operated slide gate, as shown in Fig. 1. The combustion chambers of these boilers are divided into two sections, so that in case the gas fails, powdered coal can be utilized. The coal is supplied from a storage bin above

in diameter, tower 275 feet above the ground level. They are constructed of tank-steel plates flanged with open-hearth stock and are lined with 4 inches of brick. The lining is supported by angle irons which are riveted to the stock and spaced 20 feet apart. A space of 1 inch between the lining and the shell, is filled with a slurry of cement.

The water for power plant use is taken from the Cuyahoga river. After passing through two 6-foot revolving screens located in the intake house on the west bank of the river, it flows into a concrete tunnel 1231 feet long. Two centrifugal turbine pumps, rated

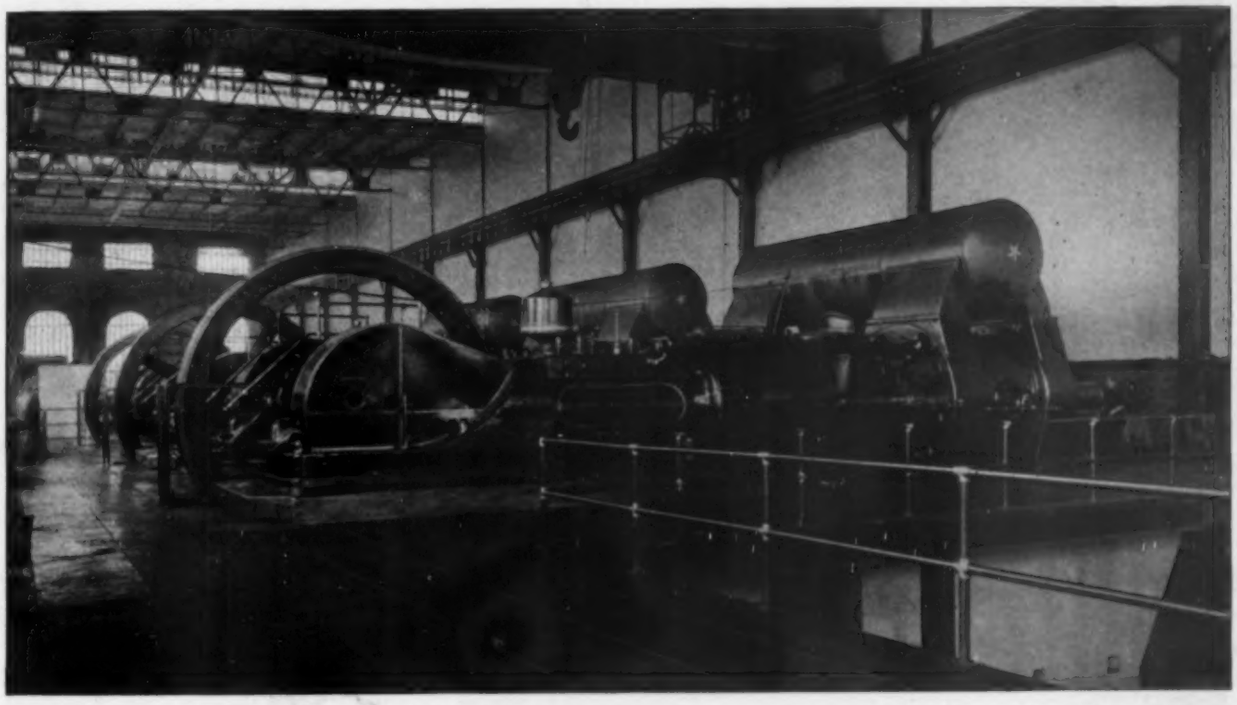


FIG. 3—MAIN FLOOR OF THE CORRIGAN, McKINNEY & CO.'S POWER PLANT, SHOWING THE 2500-HORSEPOWER BLOWING ENGINES

encased in a 3/16-inch, steel-plate, dust-tight boot. The elevator when operating at the rate of 200 feet per minute discharges five-sixths ton of coal onto an 18-inch troughed conveyor. This conveyor has a capacity of 50 tons per hour and is equipped with a self-propelled tripper. The coal is distributed into 15 double-section storage bins, which discharge through a 1-foot square opening into the main distributing arm. This distributor is equipped with a scale which automatically weighs and discharges the coal into the spreaders. The coal is deposited on the stoker and after the carbon is burned the ashes are discharged into a sheet-steel sifting hopper 11 x 14½ x 5½ feet, equipped with a spout and cast iron grate. The product passing over this grate is reburned, while the product passing by a distributing arm which deposits the material on both sides of each furnace near the fire doors.

The breeching at the rear of the boilers is 360 feet long, 10 feet wide and connects with two draft stacks—one located near No. 5 boiler and the other near No. 10 boiler. The maximum height of the breeching is 11 feet at the stacks and the minimum height is 5½ feet at each end. It is constructed of ¼-inch iron plates and is equipped with two partition dampers between the stacks. To insure favorable draft, the stacks were built higher than the usual custom. Each foundation, which is bricked solid to a height of 50 feet, is 19 feet 11¼ inches in diameter at the base and 15 feet 10 inches in diameter at the top. Resting upon these bell-shaped foundations, the stacks, each 15 feet

at 5000 gallons per minute against a total head of 142 feet, pump the water from this tunnel into a steel standpipe 21 feet in diameter and 125 feet high. The pumps are operated by individual induction motors at 1450 revolutions per minute.

The river water contains so much sediment that a filtering system was necessary to purify the water for the boilers. The purification plant has an hourly capacity of 74,000 gallons of filtered water. All filtering equipment, excepting four 1000-gallon settling tanks, is housed in the north end of the power house basement. These tanks, 30 x 19 1/3 inches, are situated outside of the building and are of first quality Washington fir dressed to 2¾ inches. They are mounted on concrete foundations and held together with round steel hoops fitted

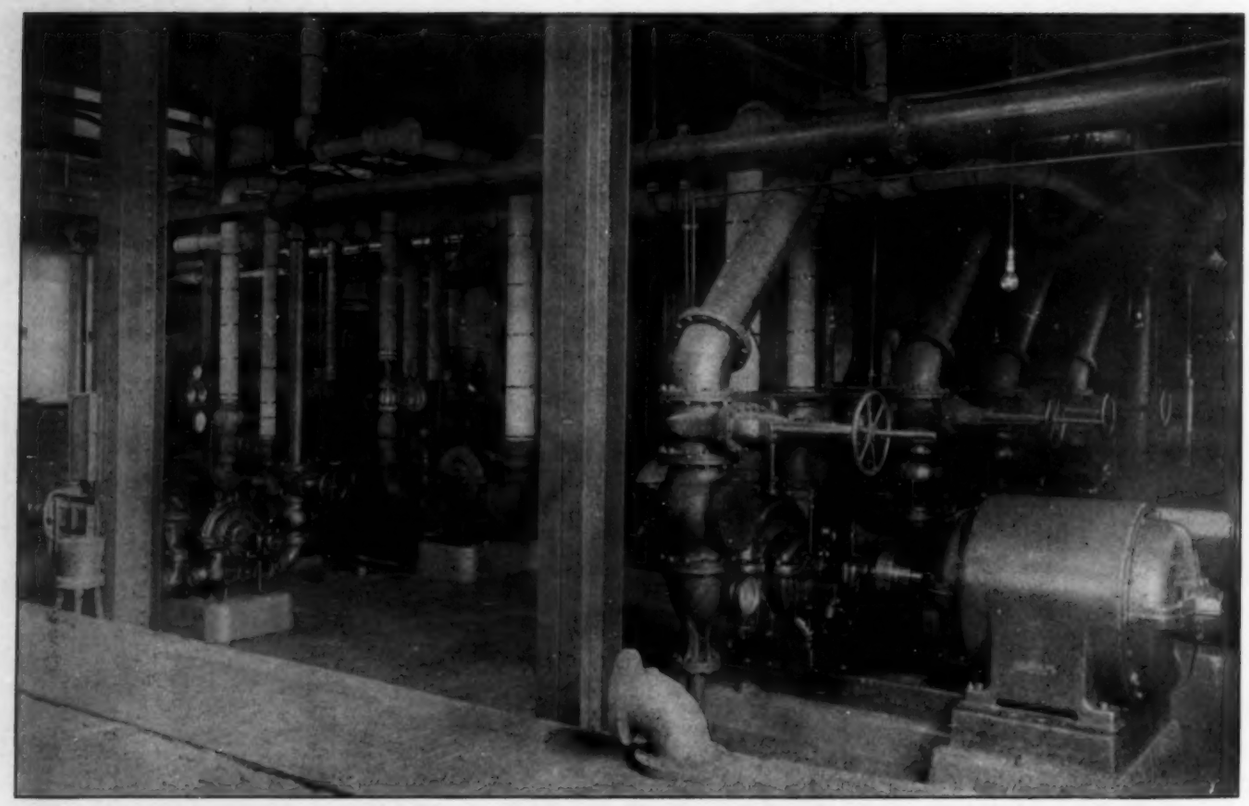


FIG. 4—PUMP ROOM LOCATED IN THE SOUTHWEST CORNER OF BASEMENT SHOWING THE STEAM AND MOTOR-DRIVEN TURBINES

with malleable iron draw lugs. The tanks are supplied with water from the standpipe except in case of emergency, when it can be obtained direct from the pumps.

The water is purified by adding soda ash, lime and iron sulphate. The chemicals are mixed in two 3½ x 2½-foot steel tanks provided with hand-operated, geared stirring devices. The tanks are reinforced around the top with angle iron rings and are equipped with filling and washing connections and suction strainers. The outlets of both tanks are cross-connected to a motor-driven pump which forces the mixture into the settling tanks.

The settling tanks and filtering beds are connected by 8-inch feed lines equipped with balanced float valves. The two concrete filtering beds, each 20 x 10 x 7 feet, are equipped with cone-type, brass strainers, screwed

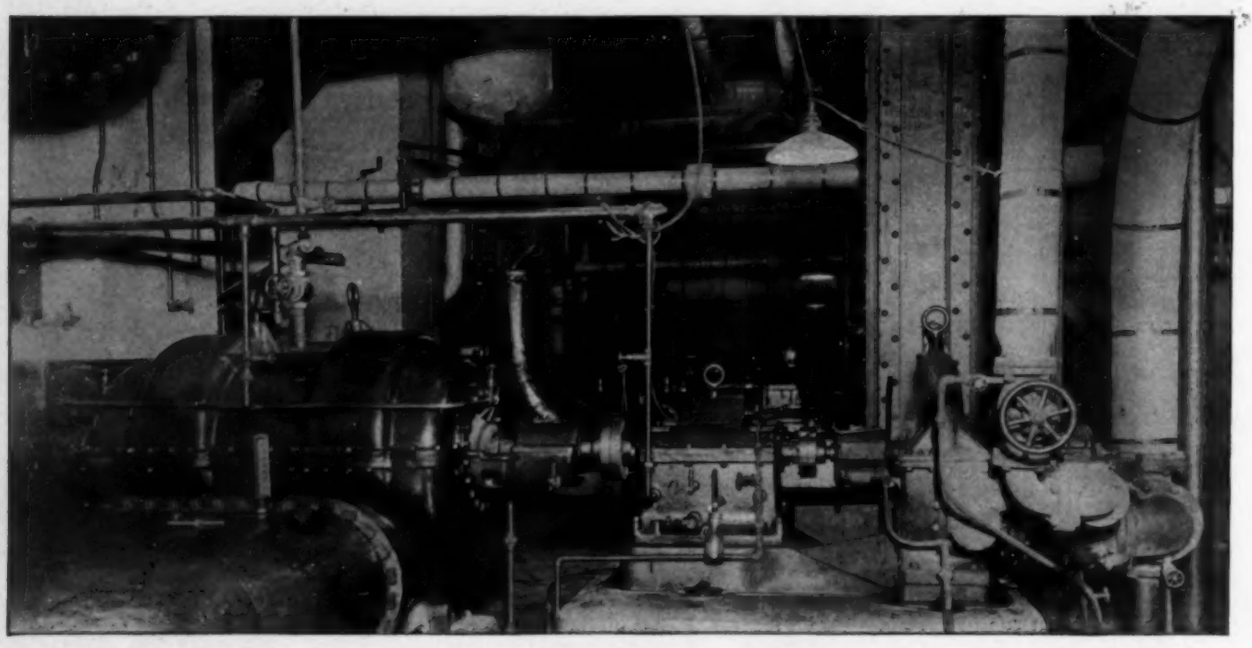


FIG. 5—VIEW OF THE CONDENSER ROOM SHOWING THE 11,000 SQUARE FOOT SURFACE CONDENSER IN THE IMMEDIATE FOREGROUND

into the pipe manifold at the bottom of the tanks. Crushed quartz, supported by a layer of washed and graded gravel, is distributed over the floor of each bed. A 12-inch floating outlet pipe attached to a galvanized cylindrical float maintains a uniform depth in the tank. Both filtering tanks discharge the purified water through 8-inch mains into the clear well. The inlet and discharge lines to this well are equipped with hydraulically operated valves which when opened or closed at the maximum limit, are indicated by tell-tale lights located on a porcelain instrument board in plain view of the operator.

Mesta Machine Co., Pittsburgh. The units are shown in Fig. 3. Each engine, 24 x 66 x 84 x 48 inches, is controlled by a 10-inch throttle valve and when operating at 73 revolutions per minute, delivers 45,000 cubic feet of air. The flywheels are each 16 feet in diameter and weigh 60,000 pounds. The gravity system of lubrication is used. Oil is fed to the main bearings, cranks, crossheads, cylinders and slides of the blowing engines from a 500-gallon storage tank and discharged into a sump. After the mixture is heated, facilitating an early separations of water, the oil is drawn into a filter, where it passes over 200

nected with the operation of the generator other than that of lubrication, depreciation, etc.

In conjunction with the previously mentioned generator, current is also supplied by two 7500-kilowatt generators which produce alternating current at 6600 volts and 820 amperes. These units are directly connected to individual, high-pressure, condensing, steam turbines and operate at 1500 revolutions per minute. The generators and the 2500-kilowatt generators were built by the General Electric Co., Schenectady, N. Y. Steam from the high and low pressure turbines is exhausted into one 11,000 and two 13,000-

FIG. 6—MEZZANINE FLOOR SHOWING GENERATOR-AIR WASHER, LIGHTING ARRESTER, BUS BARS MOUNTED ON THE CEILING, ETC.

Part of the filtered water is used for boiler purposes at the main power plant and part is used in the steel mill boilers.

The water is distributed to the steel mill boilers by two electrically driven pumps, each being rated at 1000 gallons per minute against a 125-foot head. The main power plant boilers are served by four feed water pumps which force the filtered water through a 12-inch line into two 10,000-horsepower metering feed water heaters, 22 x 6½ x 9 2/3 feet. Each heater receives exhaust steam through a 24-inch inlet pipe and heats the boiler water at the rate of 300,000 pounds per hour.

The blast for Nos. 3 and 4 blast furnaces is supplied by three 2500-horsepower horizontal, cross-compound steam engines built by the

square feet of filtering surface at the rate of 900 gallons per hour. The oil discharged from the filter reservoir is cooled by water coils and elevated to the storage tank by two duplex, steam pumps, 3 x 2 inches, which have a pumping capacity of from 8 to 20 gallons per minute.

The exhaust steam from the blowing engines is passed into a mixed-pressure turbine which operates at 1500 revolutions per minute and is directly connected to a 2500-kilowatt generator. The turbine is equipped with a 24-inch multiport, flow valve, which prevents vacuum from extending into the exhaust line further than the valve. Engineers consider a generator of this type to be one of the most efficient units in power plant practice in point of economy, since there is no motive power cost con-

square foot surface condensers The condensate is kept in circulation by pumps connected to steam turbines through 5 to 1 reduction gears and rated at 16,000 gallons per minute The condenser room is shown in Fig. 5. The condensers were built by the Westinghouse Electric & Mfg. Co., Pittsburgh. The water used for condensing the steam is piped from the standpipe and returned to the river in a two-section, reinforced concrete tunnel, 1187 feet long.

Exploring-coil, temperature indicators, built in the casing of each generator, register the atmospheric temperature around the coils. The air used in the generator is previously purified in washers which are equipped with sprays, atomizing screens and eliminators. The washers

(*Concluded on page* 1276)

Capitalizing Feelings in Industry

Workers Put Forth Their Best Efforts When Hopes, Ambitions and Temperaments, Detected by Human Engineering, Are Appreciated and Guided—Companies Now Known by the Managements They Keep

BY WHITING WILLIAMS

THE superintendent was talking: "After long and more or less sad experience, we have always learned to find from the men threatening to strike how it came about that their feelings were first hurt. When we have learned this and made amends—for it is usually the result of somebody's mistake or bad judgment—then we find that the settlement of wage demands or other ostensible reasons for the flare-up is easy."

Such testimony, I believe, comes very near to the heart of the problem of human relations in present-day American industry, a problem generally agreed to be vital to our industrial progress and to our national existence. Machine and process are straining to their utmost to furnish the larger output indispensable to a successful firing line. Personnel is everywhere admittedly capable of immensely greater efficiency and productiveness. What is the matter with the man at the machine?

The trouble will pretty surely be found to be very close to whatever is of most vital interest and meaning to persons. I submit that the factor of most vital interest and meaning to every person is nothing other than his relations with other persons. If you doubt it, try to think of words which mean more to you than mother, wife, children, friends, honor, disgrace. Each is the name of a personal relation.

By what scales are these various relations weighed that some are found so precious and others so trivial, or so hateful? By the scales of our feelings. Experience, scientific deductions, logic—these have very little to do with it. Without our feelings all values of things, persons and considerations within or outside ourselves would disappear. With them we have always within us the urge to find "our place in the sun" of relationships which satisfy our soul's desires.

Human relations became a problem in industry and a factor in production when the scale of industrial enterprise make personal contacts few and, therefore, the chances of injured feelings numerous. The corporation which would solve this problem must somehow contrive to fit itself for relations with its component persons. There is only one way; it must possess feelings. Now every person feels in three big fundamental fields. First, he has his feeling of the value of himself as a part of the world of present-living animals. This, of course, is the bottom and also pretty much the top of the motive or instinct of self-preservation. This feeling is so strong that it stretches over into the future—in the motive or instinct of reproduction. Thirdly, every real person has the feeling of his value in relation to his acquaintances and associates, his class, his community, his world. He has his self-respect.

Corporations Must Have Character

Every real corporation or organization of any kind quite as much as every real person must have these senses of its own relation-values, these feelings. Without them survival is impossible. So, too, character is as indispensable to a corporation as to persons. For what we call character is merely the general label—the index of predictability—for the kind of come-back likely to be obtained from a person or organization when its feelings come into contact with the feelings of others. Honesty, considerateness, modesty, optimism stand for good character because they stand for the kind of come-back which facilitates the most useful kind of contacts and relationships in work and life.

The first step, then in the direction of right relations between the corporate employer and the employe is for the responsible head or heads to determine that the corporation's curve of come-back shall be a circle consistent with itself at all points. The responsibility for this is perhaps the highest and most difficult placed upon the chief executive. If anywhere along the line, a superintendent or foreman persistently misrepresents the corporation's feelings—its personality—there are only two things to do—either convert him or follow scripture: "If thine eye offend thee, pluck it out—or thy hand, cut it off."

Successful relationship between the force and the corporation personality represented by the entire management will depend upon the same thing as that between two persons—upon the exchange of respect for each other's senses of value, their feelings.

The Germans have tried to find an easier way. They scientifically and unsympathetically gather superficial impressions of the other fellow's feelings and then apply logic to determine where he stands and what will be his come-back. Germany is losing the war because she regularly misguesses everybody.

There are good reasons why the corporate employer has always before him the temptation to use the German method. Obviously there are the mechanical obstacles of size and usually language. There is a much more fundamental reason. The educated forget that the other fellow out in the foundry not only lacks his chief's knowledge of the facts, but also lives not 75, but 90 or 95 per cent on his feelings. This mistake is never made by the labor leader.

It is not strange that war has become as common as it has between employer and employe. Besides the difficulty of creating a consistent and worthy corporate individuality and of getting it over to the men, undistorted and unbungled by subordinates, there are those three fields of feelings which make every worker complex and his come-back difficult to predict.

If I as an employe am to be of any use to you or myself I must keep myself in shape to develop and deliver so many B.t.u. Now, if my dollars and cents margin of bodily preservation is fairly slight, you must not blame me if I am keen on high weekly wages and on any organization that will help me get them; and if I am not over-enthusiastic about profit-sharing and bonuses unless you make it very plain to me that they are not at all at the cost of the larger daily income which I could use so well.

But it's that future tense, self-preservation called reproduction, which makes my feelings still harder to understand. I'm married. My wife and children make the present a mighty serious affair. At the same time they won't let me think simply about the present's bread and butter. So you mustn't think me queer if I sometimes refuse exceptional wages if they mean

---

A paper presented at the sixth annual safety congress and at the recent convention of the Machinery Builders' Society of America. The author, Whiting Williams, has charge of the department of group insurance in the Cleveland office of the Equitable Life Assurance Society.

such a sacrifice as, for example, good schools. It is very much worth your noticing that my feelings toward my family are deeper and more intense than toward any other persons in the world. A big, deep-down reason for this is that I always share with them my own and their very deepest emotions and experiences. Through the big moments of sickness or accident, of marriage, of death, and of birth we always hope to go hand in hand. That's what families are for.

Family is a Point of Contact

Inside the family and out, real friendship depends not upon the number of contacts, not upon agreement in feelings or viewpoints, but upon sharing together the biggest and the deepest feelings and experiences. Now, remembering that as an employe I live 90 per cent on feelings and that my deepest feelings are toward my family, you will see that the thought of our future makes the subject of protecting my family against my disability by old age, sickness, accident or death, a mighty interesting field. Also, don't fail to note, one in which you as my employer can come closer to me than in any other. But you can only enter when you bring with you respect for me and my feelings, and a sincere sympathy that is far removed from either sentimentality or pity. The company picnic helps carry the management into this family connection. The really successful company physician, the trained nurse, or the service worker are all sure to find themselves unconsciously establishing these family contacts and for that reason must combine technical skill with tact.

Features of Group Insurance

It is undoubtedly because of the intensity of these feelings of family in the supreme crisis, death, that group insurance has had so amazing a growth since its inclusion within the scope of the Equitable. Mechanically, it is based upon the discovery that a body of 100 or more associated workers represent two co-operative advantages, that of a constant average of normal health and of normal, medium age without the indelicacy or expense of individual physical examination, and too, the economy of co-operative buying as the result of wholesale solicitation and wholesale collection.

For several years the writer was the secretary of Cleveland's Federation for Charity and Philanthropy, whose 57 constituent organizations required the solicitation of something like $450,000 in yearly gifts. Of every dollar secured for the relief of families in their homes nearly 50 cents was required for virtual widows and orphans, the father dead or permanently disabled. Even in the states where workingmen's compensation is in effect, it is said that only 6 or 7 per cent of the deaths of workers are such as to secure its awards. The families of the other 93 who die from ordinary causes require assistance by friends or charity.

The third field of feeling, self-respect, is such that probably few workers would care for the insurance award even at the moment of direct need, if it represented merely the expression of the employer's philanthropic motives. The consumer might also object if even its slight cost were located on the industry and put into the selling price. But at the recent national conference of employment managers it was agreed that an average of $40 is extremely low as the cost to every business of replacing one employe with a new one. The lengthened service, as well as the increased interest in it, which is generally reported to follow the plan's installation, comes not simply from sharing with the worker his family feelings, nor from his increased freedom of mind and sense of value to his wife and children. It is also caused by the fact that these last named come to have a special stake in that particular place of work. In some group-insured factories, indeed, the wives have called to request the management never to discharge their husbands without first consulting them.

Because the group plan of family protection touches the worker where he most deeply and most completely lives, the occasion and the manner of its installation, the nature of the president's speech or letter announcing it, the methods of its service and its maintenance in the attention of the workers—these call for the considerateness and the character required for the larger problem of human relations rather than for the mere buying or selling of ordinary insurance protection. Neither as humanitarianism alone nor as good business alone is the plan at its best. It is a combination of good will and good business.

The sentinels of self-respect, that third field, are as watchful for the handworker as for the headworker, possibly more so. By long social experience all of us have developed a sort of protective behavior. We unconsciously test the other fellow for insincerity and motives in exact proportion as he tries to come into intimate relation with us. Welfare work is always, therefore, tested severely. Even the tone of the voice becomes important, the smile indispensable. Production is impossible wherever capital and labor have cut off relations and are at war with each other. The greatest waste in industrial America today is the vast amount of unused physical, mental and spiritual energy.

There never was a time so favorable for the obtaining of this equilibrium between employer and employe as now. As never before in decades we are all feeling together in the sense of common danger. And we are feeling together deeply. Such a moment may not come again in 50 years. Such a moment calls for industrial statesmen. The essence of industrial statesmanship is the essence of all statesmanship—opportunism, the quick recognition and the instant grasping of industry's big moment before it passes.

Increased Use of Abrasives

The value of abrasive materials produced in the United States in 1916 was $4,600,248, according to statistics compiled by F. J. Katz, of the United States geological survey. Of this, $1,664,339 was the value of natural abrasives, and $2,935,909 the value of artificial abrasives. The abrasive materials imported for consumption in 1916 were valued at $555,850. The apparent total consumption of abrasive materials in 1916 was thus $5,156,098, an increase of nearly 30 per cent over 1915.

One of the features in the year 1916 was the tremendous increase in the domestic output of emery and artificial abrasives, a direct effect of the war, which caused a great increase in the use of these grinding materials and which cut off supplies of emery from Turkey and Greece.

To Promote Research

The Canadian parliament has ratified an appropriation by the government of $91,600 for the recently established Bureau of Industrial and Scientific Research. Dr. McCallum, of Toronto University, the chairman of the commission, will devote his whole time to the work and will receive a salary of $10,000. The plan includes the selection of university students who show an aptitude for investigation along certain lines, allowing them $600 for the first year and $750 the second year. Subsequently they may either continue their investigations in college or be transferred to industrial plants to make a practical application of their ideas. It was announced in this connection that the University of Sackatchewan would undertake an investigation of the commercial possibilities of the western coal areas.

Right Coal Test is Dollar Economy

Purchasing of Coal on an Analysis Basis Seems Advisable if the Results Are Interpreted Correctly—An Examination on Boiler Grates is as Enlightening as Tests Within the Laboratory

BY E. P. LATER

WHEN an eastern concern engaged a power specialist to go over its plant and find out where economies in the production and use of power could be brought about the management learned that in most instances only minor changes were necessary to put everything in an efficient condition, but what the specialist said about coal was rather startling. By his tests he had found out that the concern was paying a good price for a rather inferior coal which was not only far from being of uniform quality but was not entirely suited to the type of equipment employed, and he was able to show that several thousand dollars a year could be saved by a more intelligent and careful supervision of the purchase and use of coal.

For example, apparently no effort had ever been made to determine the type of coal best suited in every way to the concern's needs and it had been content to buy year after year a certain grade which had been offered by an enterprising dealer. Instead of specifying the amount of ash, moisture, etc., or at least making an analysis of each lot to determine these, it was the custom to run an evaporation test at intervals of a few months.

This was done by weighing the amount of coal used during a 24-hour period, and since the quantity of water turned into steam in this time was known it was possible to determine the relation between them. When properly conducted a practical test of this nature is of considerable value and has its place, but in this particular instance it is doubtful if the results obtained were worth the time and trouble it took to get them. In the first place, the test was carried on for such a short period that a number of factors, such as the small amount of coal consumed, errors in weighing the coal and measuring the water, etc., would tend to affect the accuracy of the results. Further, this test was no doubt intended to keep some sort of check on the quality or uniformity of the coal, but it is obvious that reliable data on these points can hardly be gained by testing an occasional small sample.

On the expert's advice, arrangements were made to have each shipment of coal tested and the results of this policy have been so satisfactory in every way that the firm would not even consider going back to the old practice.

Probably this experience could be duplicated dozens of times among manufacturers and other large users of coal, for in spite of the fact that this mineral is one of the most important and widely used of all substances, particularly in an industrial way, much still remains to be done toward placing its purchase and use on a more scientific basis.

Is Coal Always Coal?

When you're in need of iron or steel you don't purchase it on the meager description that you want so much of either metal. You specify, say, the maximum or minimum carbon and manganese content permissible. Perhaps later you apply a physical test.

Now why not the same care with coal? There are as many coals as there are steels—possibly more. In the car all coals look pretty much alike, but when they're subjected to a grilling underneath your boiler you may look to your ledger for the answer.

Buying coal blind to its heating value smacks of grab-bags and swapping sight unseen, of childhood days. Coal is not always coal after the chemist has translated it into ash and sulphur and moisture and heat units.

Coal Seems Simple, But Is Not

When we come to study coal closely we find that it is not such a simple substance as might be supposed, but is, instead, a highly complex mixture of organic compounds of various kinds with more or less inorganic matter or ash. We know in a general way that coal was formed from trees and plants which lived millions of years ago, but many questions relating to its exact method of formation and of the composition of some of its constituents are still unanswered, although our knowledge on these points is being extended constantly.

Then, too, coals vary widely in their composition and properties, ranging all the way from lignite, which is in some ways more like peat than bituminous coal, down to anthracite or hard coal. It can be seen, therefore, that the selection of the proper coal from the grades available is not always an easy matter and generally involves close consideration of a number of factors. Before discussing some of the characteristics of the various grades and varieties of coal, subsequent statements may be clearer if something of the methods of analysis and of the results obtained thereby is given. Some of the determinations which are ordinarily made on coal are rather empirical in their nature and may not mean much if taken by themselves, but when all of the results are considered together it is usually possible to draw conclusions which are definite enough regarding the nature of the coal and its suitability for any particular purpose.

Coal analysis may be distinguished as ultimate, wherein the amount of carbon, hydrogen, nitrogen, etc., is determined, and proximate, in which the amount of ash, moisture, volatile matter, sulphur and perhaps heat value is sought. The former procedure gives interesting and helpful information and is often followed out, but the proximate analysis is simpler to make and is more widely used because for most purposes it gives all of the data desired, particularly in routine examinations.

The determination of the ash left after all of the combustible matter has been burned off is of considerable importance, since it shows the amount of worthless mineral matter contained in the coal. Obviously, this is at best an undesirable constituent inasmuch as it furnishes no heat, necessitates the handling of more coal and may be of such character that unusual care must be exercised in firing and, finally, its removal occasions some expense.

Just how objectionable ash is depends very largely on its character and this differs widely in various coals. Some ash contents have such a high fusing temperature that they are hardly affected by the conditions

in the ordinary furnace and are, on the whole, merely so much inert matter, not interfering with the passage of air through the grate and permitting of easy removal.

Other ashes have a low melting point and tend to form clinkers and porous, spongy masses which may cause more or less trouble but not necessarily interfere seriously with the operation of the furnace. When an ash has a still lower melting point it may melt down to a thin liquid which will flow all over the grate bars and greatly hasten their destruction, besides cutting off the draft.

Firing Methods Important

It is well known, however, that firing methods have a great deal to do with the formation of clinker and of two men working on the same coal, one may obtain appreciably better results in this respect, so it is not always entirely a question of the melting point of the ash, but the temperature to which it is subjected. It is, however, becoming customary among some of the large users of coal to make fusing-point determinations of the ash as a part of the routine examination of new shipments.

In regard to the percentage of ash, specifications usually place a maximum limit on this and coals which fail to meet it are penalized so much a ton; if the ash is lower than the limit set a bonus may be paid.

Moisture is present in coal in two different forms: that which is held mechanically and that which is in chemical combination. The former may be driven off and the amount determined by heating a properly prepared sample of the coal to somewhat over the temperature of boiling water, weighing before and after heating. The water of composition can be driven off only by heating the coal to a temperature at which the volatile matter is evolved.

Moisture varies according to the treatment of the coal and the state of the weather and, like the ash, is so much inert matter. Instead of giving heat it actually causes a loss, in that a certain amount of energy is required to vaporize it and drive it off as steam. The loss sustained in this way is not, however, very serious in proportion to that which arises from paying coal prices for whatever water is in the coal at the time this is weighed. A certain amount of water is of advantage in promoting more thorough combustion, but it is cheaper to buy water as such and add it to the coal, rather than to purchase it at the price paid for the latter.

Volatile matter is the term applied to that portion of the coal which can be driven off by the application of heat. It consists largely of carbon-hydrogen compounds, together with water, ammonia, etc., and may, therefore, contain a considerable proportion of noncombustible gas. As a general proposition coals high in volatile matter are particularly valuable for gas-making, but are not so well suited for use in ordinary furnaces inasmuch as there is difficulty in securing complete combustion of the gases, resulting in the production of heavy smoke.

The sulphur content of a coal is of some importance to the buyer, because the amount of heat it gives off during combustion is comparatively slight and this is more than overbalanced by the harmful effects of the sulphur gases, in the way of causing corrosion. In most cases there is a fairly definite relation between the ash and the sulphur content; that is, few coals are found, on the whole, with high ash and low sulphur, or vice versa. Further, the opinion is held by some buyers that the sulphur content is a measure of the clinkering qualities of the coal and in certain cases there seems to be a relation between them, but apparently it is only incidental and there are so many other factors entering into the case that it is not safe to draw too broad conclusions from the sulphur alone.

Ascertaining Heat Value

Coal is used primarily for furnishing heat or energy, so it is important to know the amount of heat which it is capable of developing. The principle involved in determining this is simple and consists in burning a known weight of the coal in such a manner that the heat given off can be accurately measured. Due precautions must be taken, of course, to prevent the loss of any heat or the introduction of errors which would affect the value of the results.

In practice, the coal is ground to a fine powder and burned in a closed metal bomb immersed in a definite quantity of water. The whole apparatus is known as a calorimeter, of which there are several types which differ in minor details. In one, after the coal has been placed in the bomb this is filled with oxygen gas at high pressure in order to insure complete combustion of the coal. In another form of calorimeter, which finds a wide use, the coal is intimately mixed with chemicals of an oxidizing nature, which take the place of the compressed oxygen. The charge is fired by means of a fine iron wire placed in contact with the mixture and heated to incandescence by a current. The temperature of the water surrounding the bomb is measured by delicate thermometers before and after the combustion of the coal and from these data it is possible to calculate the calorific value, as it is called, of the coal or other fuel. It is usually expressed as so many British thermal units, or B.t.u. for short. One British thermal unit represents the amount of heat required to raise the temperature of one pound of pure water one degree Fahr. at a temperature of 60 degrees Fahr.

Comparison of Kinds of Coal

Coming back to the various kinds of coal, it may be interesting to see how they compare with each other when subjected to the tests outlined above.

Peat, which can hardly be called a coal, has an extremely high moisture content, and up to about 12 per cent ash. In this country it finds some use as a domestic fuel, but so far has not been used to any extent in place of coal for generating steam.

Lignite is usually also very high in moisture content and varies widely in its composition. The ash, for example, ranges from 1 to about 50 per cent. On the whole, it is a distinctly low-grade fuel and does not stand handling very well. It is generally used in the district where it is mined.

Bituminous, or soft coal, surpasses all other fuels in importance and millions of tons are used annually in this country alone. So far as composition and character are concerned, these vary widely in the coals coming from different parts of the country. The volatile matter, for instance, runs on the average about 28 per cent, although in some cases it goes much higher than this, western coals having as a rule more than those coming from eastern mines. Rather wide differences are also found in the sulphur, ash and moisture content and British thermal units.

These coals also behave differently when heated; some of them, termed coking coals, swell up and in a way fuse together, leaving a residue which is hard and coherent but spongy in texture. This is known as coke and consists principally of the uncombined carbon and ash present in the coal. Other coals, upon heating, do not fuse together and the residue coheres only slightly or not at all

and are distinguished as noncoking or free-burning coals.

The term semibituminous is applied to those grades which are somewhat harder than the preceding, contain considerable less volatile matter and yield a little more heat per unit. The ash ranges from about 5 to 13 per cent, while the sulphur also varies considerably.

Anthracite, or hard coal, contains the least volatile matter, averaging around 5 per cent, is harder and denser than any of the other types and burns with a nonluminous flame. It is largely used for metallurgical purposes, in making gas and as a domestic fuel, for which it is well suited.

Equipment is Factor

This outline necessarily indicates only roughly some of the more important characteristics of the different coals. Enough has been said, however, to show that wide variations exist not only between the various classes, but also between the members of the same class and the purchaser is confronted with the problem of selecting from among these the one which will give the greatest amount of heat for the least money and at the same time, of course, permit the utilization of the equipment then used.

The solution of this is not always easily found and in the search for it the resources of both theory and practice, as represented by laboratory tests, on the one hand, and practical boiler tests on the other, must be employed, inasmuch as it is hardly safe to take the results obtained by either method alone as the sole criterion of the value or suitability of a coal, and a few suggestions as to the procedure may be helpful.

Naturally, an investigation of this sort is a task of some magnitude, if the ground is covered thoroughly, and may involve the examination of a large number of bituminous and semibituminous coals or it may even be advisable to consider the use of steam-size anthracite or anthracite screenings, if the conditions are such that these can be used satisfactorily. Therefore any efforts which can be made to lighten the work are well worth while.

Time and trouble will be saved and matters simplified generally if at the outset a thorough analysis is made of the situation as regards the type of equipment used and the operating conditions which must be met, as in this way it is possible to define broadly the character of the coal which will give the most satisfactory service in every respect. For example, if the load is subject to rapid and more or less extreme fluctuations, it is apparent at once that a quick-burning coal, one with fairly high volatile matter, will give the best results. Otherwise, a slower burning coal, with lower volatile, will prove satisfactory. If a high volatile coal is indicated, it may be necessary to set a maximum limit on this constituent, in turn, for the purpose of meeting smoke regulations.

If the boilers are working to the limit of their capacity, it will likely be necessary, or at least advisable, to use a superior grade of coal at a corresponding price, but if the overload is not too large the possibility of using a cheaper, lower-grade coal should be considered, since it may be economical to do so. In this connection, if the fires must be forced it is necessary to watch carefully for the ash and sulphur. Coals with an ash of low fusing point should be avoided because of the trouble liable to result from clinkers, and it may be advisable to determine the minimum fusing point which can be safely allowed. With high fuel-bed temperatures, high sulphur in the coal tends to produce rapid destruction of the grate bars, a condition which is troublesome and expensive. With lower rates of combustion a higher content of sulphur is not objectionable. There is no economy in using a coal with low sulphur when one with a higher content can be used equally as well, since this means that a coal of higher quality and price than demanded by the requirements is being burned.

Low Ash Coals Costly

The same thing holds true with the ash. Coals with a very low ash content usually cost much more in proportion to their actual fuel value than do coals which are of good quality but with a higher ash; therefore, it should be determined how large an amount of this constituent can be allowed without reducing the capacity of the plant or running into other difficulties.

When some of these points have been settled, and it is good policy to enlist the aid of fuel experts before drawing final conclusions, it will be possible to eliminate with a minimum of trouble and expense any coals which are offered for purchase but fail to meet in any important respect the requirements which have been decided upon. To determine whether they do measure up to the standard it will be necessary to have an analysis made and it may be said here that unless a great deal of care is taken to insure the proper performance of the work very erroneous and misleading results may be obtained. Too often the taking of the sample of the coal is regarded as of little real importance and may be entrusted to some ignorant and irresponsible laborer, whereas it is just as important as the analysis itself. If the sample does not correctly represent the lot it is evident that the results of the analysis will be of little value. The sample should contain, as closely as can be determined, the same proportion of lump coal, fine stuff, slate, etc., as in the total shipment and in every way represent it faithfully.

Importance of Analysis

When the results of the analysis are reported they must be intelligently interpreted before any reliable conclusions can be drawn. This means that the various figures should not be considered alone, but in relation to all of the data, since very misleading opinions may be formed by judging a coal merely on the basis of the ash of British thermal units or some other content.

A case of this sort came up when a young engineer in charge of the power plant of a large factory announced to the manager that he could make a big saving through the use of another grade of coal. His conclusions were based on a very hasty consideration of the results of a test on a small lot of the coal in question, as compared with the coal then in use. The manager was cautious enough to seek expert advice before making the change and it was soon shown conclusively that the proposed coal was not at all suited to his requirements and that it was not so cheap, considering everything, as the other. Had it been adopted an actual loss would have been sustained. Incidentally, the expert did show the manager that a coal costing a few cents a ton less than the one he had been buying could be used satisfactorily and, inasmuch as the plant's consumption is fairly large, the saving has been considerable.

Aside from his other mistakes, this engineer made the serious error of basing too much on the results of an examination of a single sample of coal. The output of a mine varies more or less from day to day and a sample taken at any one time may not be fairly representative of the average product; consequently a coal may easily be made to appear either better or worse than it normally is. It is much better to have analyses

made on two or three good samples which have been taken at different times, since this not only affords a check on the results, but may give some idea of the uniformity of the output.

After information has been secured on a number of coals available it should be possible to eliminate all but one or two, perhaps, from further consideration. With these it would probably be advisable to run a practical boiler test, not so much for the purpose of checking up the relation of fuel value to price as to determine whether the coal possesses any physical properties which make it unsuited for the equipment of the plant or operating conditions. There is the possibility that trouble will be encountered from clinkering, packing down on the grates or from inability of the type of stoker used to handle the coal in question to advantage. A practical test will settle all this definitely. Most, if not all, of the other things which the buyer wants to know when selecting a coal can be determined with much less trouble and expense and more accurately than by a boiler test, but as a means of observing the behavior of the coal under operating conditions such a test has its peculiar value.

Whether or not coal should be purchased under specifications is a matter for each to decide for himself. The principle is sound and there are many advantages in favor of such a procedure providing, of course, that the requirements are correctly drawn. Naturally, enough thoroughly reliable data must be at hand to enable the purchaser to work intelligently and with a full knowledge of the requirements and limitations of his plant. If the selection of the coal has been carelessly done or if the specification is drawn up in a haphazard manner good results can hardly be expected. On the other hand there is no doubt that good specifications, combined with careful tests of all coal delivered, pay in the long run. And it may be added that systematic testing of shipments is too valuable a safeguard to be overlooked regardless of whether specifications are used, for it is only in this way that the buyer can keep track of the variations in quality which are certain to occur or tell with any degree of accuracy whether he is getting his money's worth.

Manganese Investigation---A War Problem

ON ACCOUNT of the increasing difficulty in obtaining imported manganese and the vital importance of manganese for the production of the steel needed in making war, the United States bureau of mines is making a thorough investigation of the possibilities of relief through a more extensive use of domestic ores. Because the problems of ore concentration are similar to those of iron ore, these investigations have been assigned to the Lake Superior station recently established at Minneapolis. Although the bureau realizes the importance of taking up the iron ore concentration problems at the Lake Superior station as soon as possible, yet such work is obviously to be classified among the "peace-time problems" relating to conservation; whereas the manganese investigation, under present conditions, is strictly a "war problem" dealing with increased production. The Lake Superior region is an important producer of manganiferous iron ore; it contains large reserves of these ores and can mine and ship much larger amounts if metallurgical practice can be so modified as to make ores in better demand.

Depend on Foreign Supply

For many years American steelmakers have relied on manganese alloys imported from England, and on manganese ores from India, Russia and Brazil. These imported ores are high in manganese and are suitable for making 80 per cent ferromanganese. With the low ocean freight rates that prevailed generally during the 10 or 20 years, it was well-nigh impossible for producers of domestic manganese ore to compete with imported ore. Consequently the manganese industry of the United States languished.

With the outbreak of the war in Europe in 1914 the manganese industry of the world faced new conditions. The entrance of Turkey into the war cut off shipments of the Russian ores from the Caucasus region. A growing scarcity of available ocean tonnage has made it increasingly difficult to transport the material from the usual producing countries and the great rise in ocean freight rates has increased the cost of imports.

Until last year this demand had little, if any, effect on production because of the difficulty of interesting capital in an industry that might die with the ending of the war. A clearer and broader conception of the causes of high manganese prices and a belief in the likelihood of these causes existing for some time after the close of the war has partly removed that tendency. A far greater difficulty in obtaining domestic supplies is the fact that manganese ore of high grade, suitable for making 80 per cent ferro, is very scarce in the United States, manganiferous iron ores being much more abundant. Such ores have not been in much demand by the steel industry in the past, and it is essential to investigate carefully, by research on a large scale, the possibilities and limitations involved in their use. It is this work that the bureau of mines desires to carry out as rapidly as possible.

The bureau plans to assemble and tabulate as much information as possible concerning the character and available tonnage of known domestic ores; the current practice in mining and concentration; and the present methods of manufacturing manganese alloys and of using them in steel. When compiled, this material should afford a starting point for various original researches dealing with related problems.

To Carry On Researches

The possibility of concentrating various types of ores will be studied by detailed tests and experiments; fundamental thermochemical data relating to manganese and its compounds, will be determined, and the equilibria of certain fundamental reactions between iron and manganese compounds will be studied. Also, much attention will be given to the development of possible substitutes for manganese in steelmaking; to the possibility of using, more extensively, alloys that are not used in what is now considered standard practice, such as alloys containing between 20 and 80 per cent manganese, and alloys containing manganese and other constituents and to the possibility of increasing the manganese content of basic pig iron in order to lessen the amount of manganese alloy added at the end of a heat, part of this being left as residual manganese in the bath metal. Another problem that will be studied in the light of the results already obtained will be the production of manganese alloys in the electric furnace in localities where power is cheap. During the past summer the bureau has been carrying on a series of experiments in Pittsburgh on the production of alloys in the electric furnace from slags high in manganese.

Is Your Furnace a Heat Slacker?

Fuel Will Win the War; One Ton of Coal Must do the Work of Two—Proper Insulation, Described in This Article, is One Proved Method of Curbing Costly Heat Radiation

BY L. W. MOFFETT

SHORTAGE of fuel at blast furnaces, steel mills and elsewhere has directed attention sharply to the necessity for conserving heat. Fuel economy is more vital today than ever before in the history of the nation. Not only is it necessary to save fuel, owing to the reduced supply arising from the congested condition of railroads, labor shortage, etc., but it is being increasingly recognized more than ever that fuel saving appliances are essential to modern practice. Fuel is no longer considered an unimportant factor in costs, but on the contrary has become an element that is being seriously reckoned with.

Reasons for Conservation

Increasing prices of fuel, raw materials and labor have made it necessary that the cost of production in the iron, steel and related industries be cut as much as possible. Improved construction and design of open-hearth and blast furnaces, boilers, annealing furnaces and other equipment has appreciably brought down costs and increased output. Until recently, however, but little attention has been given to the question of saving heat. This is so, despite the fact that the loss of heat by radiation has long been recognized by engineers as being largely preventable. One reason why heat conservation had not been applied practically was because most of the nonconductors which were available either would not withstand high temperatures or were structurally weak. A few years ago this objection was overcome when there was adopted in this country a process for the manufacture of insulating brick composed principally of diatomaceous earth, or kieselguhr.

A Cellular Substance

This substance consists of countless small shells of almost pure silica, each one hollow and filled with air and it is this large amount of dead air that makes diatomaceous earth an ideal nonconductor of heat. To utilize the earth to best advantage for the purpose of insulation, it should be put into a form that is easy to handle. To this end the earth is mixed with finely ground cork, molded into brick form and then fired. The cork is burned out, leaving an

Hooverize Your Fuel

Manpower is waning, coal stocks are vanishing, transportation of fuel daily becomes more difficult. Stripped of befogging verbiage, no situation is more pressing today than that of fuel.

Conservation of fuel—which means heat a step farther on—is almost wholly a manufacturer's problem. Just what are you doing to conserve the nation's heat?

Are you permitting dollars to radiate off your furnaces because you think the leak too insignificant to plug? Are you actually refusing to lower your operating costs, denying yourself a larger profit, by failing to take the obvious, and right now the patriotic course?

Loss of heat by radiation is easily and profitably preventable. Do your bit and make your fuel as near 100 per cent efficient as is humanly possible.

FIG. 1—KEEPING THE HEAT IN THE FURNACES INSTEAD OF WASTING IT IN THE ATMOSPHERE
A Battery of Heat-Treating Furnaces at the Eddystone Plant of the Remington Arms Co. Protected from Excessive Heat Loss by Insulating Brick

FIG. 2—ANNEALING FURNACE DOORS PROTECTED FROM HEAT LEAKS

extremely porous insulating brick which, it is said, will transmit only one-tenth as much heat as fire brick or common brick. This product is manufactured by the Armstrong Cork & Insulation Co., with main offices in Pittsburgh and plant at Beaver Falls, Pa. The brick weigh but 1½ pounds each and are said to be strong enough to support any load ordinarily encountered in furnace and oven construction. The standard straight brick are nominally 9 x 2½ inches in size, making them particularly suitable for this service, as the courses of brick can be readily bonded with the courses of fire brick or common brick. Insulating brick are not designed, however, nor can they be used as a substitute for fire brick.

Keeping the Heat in the Blast Furnace

In blast furnaces the insulation is used principally in stoves and hot blast mains. Together with the fire brick lining, insulating brick are put up next to the steel shell. The Zenith Furnace Co., Duluth, Minn., has two stoves with their attendant vertical blast mains insulated with 2½-inch brick furnished by the Armstrong company. The average temperature drop of the blast after the insulating brick was put in was 50 degrees Cent., or 90 degrees Fahr., in an hour. In ordinary practice the temperature drop is 100 degrees Cent. In other words, the loss was practically cut in two. The result is more uniform operation of the furnace and greater production of iron because of the increased and more uniform temperature of the blast. Obviously, the higher the temperature of the air entering a furnace, all other things being equal, the sooner will the melting point be reached. In open-hearth furnaces this insulation is used quite successfully around the regenerative chambers.

Cool Rooms Make Workmen Efficient

The heat usually lost by radiation from walls, arches and doors of furnaces and ovens not only does no useful work, but actually does harm by increasing the temperature of the rooms, thus decreasing the efficiency of the workmen. It has been estimated that if one 4½-inch course of insulating brick is built in the walls, arches and doors of furnaces or ovens the amount of heat lost by radiation will be reduced by 60 per cent more. This means that less fuel will be required and at the same time the furnace rooms will be much cooler. Evidence supporting this claim has been submitted in abundance by many industrial companies using this insulation.

Heat Insulation in Practice

In a malleable iron foundry at Indianapolis the top and side walls of one annealing oven were insulated with 4½ inches of insulating brick, while the other ovens of the same type and size were left uninsulated. It took an average of 66½ hours to bring the uninsulated ovens up to a temperature of 1500 degrees Fahr. In the case of the insulated oven, it required only 50.7 hours to bring it to this temperature. This represented a saving of 15.8 hours, or 23 per cent, in bringing the latter to the temperature at which it was desired to operate it.

In the plant of the Elyria Enameled Products Co., Elyria, O., the usual practice was to build the furnace walls of five 9-inch courses of fire brick. Even with this protection, the outside of the walls of the furnaces were so hot that if water were thrown on them it would steam noticeably and sometimes would actually boil. In building a new furnace of the same type as the old ones, the wall thickness was reduced from five courses of fire brick to two courses with one course of insulating brick added, a net saving of three courses of fire brick. This resulted in a material reduction in the amount of heat lost by radiation, and it is now possible to hold one's hand against the outside walls without discomfort.

In June, 1916, C. A. Eastwood, super-

FIG. 3—LAYING A COURSE OF INSULATING BRICK IN A WATER-TUBE BOILER SETTING

intendent of station A, Pacific Gas & Electric Co., San Francisco, ran a test to determine how much fuel could be saved by the use of an effective heat insulating material in boiler settings. For this experiment he selected a 560-horsepower Babcock & Wilcox boiler, the steam drums of which were covered with one course of common brick. A rectangular can containing a measured quantity of water was placed on top of one drum and the boiler run at its rated capacity for a period of three days. During this time the rise in temperature of the water was carefully noted and with these data it was a simple matter to determine the amount of heat radiated per square foot of surface per hour, the amount of heat radiated from the total exposed area of the drums, and the quantity of fuel which was being burned to make up for this loss. The figures obtained showed that this loss totaled 390 barrels of oil per year.

One 2½-inch course of insulating brick was then placed on top of the common brick covering and readings were taken as in the preceding test. The results showed that the loss of heat with the insulation in place amounted to only 144 barrels per year, a saving of 246 barrels, or 63 per cent. With oil costing 70 cents per barrel, the saving amounted to $172.20 per year.

It should also be noted that the total amount of heat lost represents that radiated from the steam drums alone and that only 2½ inches of insulation were used. Had the radiation from the exposed boiler walls also been included, the total heat loss would have been greatly increased. Furthermore, if the common brick had been replaced entirely with a course of insulating brick set on edge, giving 4½ inches of insulation instead of 2½ inches, a still greater saving would have been effected.

In view of these figures it would seem that the proper insulation of furnaces, boiler settings, blast furnace stoves, blast mains and similar equipment would result in the saving of many thousands of tons of fuel each year. The subject, at this time, is certainly one which deserves earnest consideration.

Book Review

Non-Technical Chats on Iron and Steel, by LaVerne W. Spring; cloth; 358 pages, 5¾ x 8¼ inches; published by the Frederick A. Stokes Co., New York, and furnished by THE IRON TRADE REVIEW for $2.50 net.

Reference to the concrete in terms of the abstract is as distressing to the artisan as it is inadequate to convey the intent of the layman. Probably no industry has suffered so much from this confusion as the metal trades; iron and steel, in the mouth of the layman, may mean anything from a cast iron radiator to a high-speed machine tool. It is to overcome this mischoice of terms and to ground the uninitiated in the fundamentals of the industry that the author, who is chief chemist and metallurgist for the Crane Co., Chicago, has launched his volume. The title aptly conveys the why and wherefore of the work; indeed, it is a six-word summary of the contents.

Back into the misty ages of some 5917 years ago, when Tubal-Cain won the appellation "artificer in iron and brass" is the reader first taken. Hastily, but thoroughly, the developments of the processes of making iron as civilization advanced are traced. Fair detail is used in describing the methods of procuring or producing the various materials—iron ore, coke, charcoal and coal. Blast furnace operation is gone into exhaustively by the author. Then before proceeding further, and to give the reader a comprehensive view of the ferrous world, the metallographic method of classification, chemical analyses and physical tests are set forth.

Chapters on the bessemer and open-hearth processes, cast iron, malleable iron, cast steel, the alloy steels, high-speed steels, the heat treatment of steels, the rolling process, the rolling of rods, wire and wire drawing, the manufacture of pipe and tubes, transformations and structures of steels and the equilibrium diagram of the iron-carbon alloys follow in order.

The subject matter is couched in a simple and effective style. A happy medium is struck between irksome, technical detail and unstudied, instructive fact. Altogether, it is an excellent book for anyone seeking an every-day working knowledge of the iron and steel industry. Incidentally 13 of the 23 chapters are reprinted practically as they appeared, in 1915 and 1916, in *The Valve World,* the Crane Co.'s house organ. Two hundred and ninety-four illustrations are used.

No Flour for Foundries

Foundrymen throughout the country are being urged by the United states food administration, headed by Herbert C. Hoover, to curtail or eliminate the use of flour for pasting cores, etc. It is pointed out that thousands of barrels of low grade flour are used for this purpose every year in American foundries. Under normal conditions, this consumption is of no consequence to the food situation since the flour is not of a character ordinarily used in this country for food purposes. At present, however, this flour can be advantageously employed both here and abroad.

Modern Steel Plant Power House

(*Concluded from page* 1267)

are shown in Fig. 6. Water is supplied to the washers by motor-driven centrifugal pumps manufactured by the Lawrence Machine Co., Lawrence, Mass.

Two 100-kilowatt turbine-driven exciters and one 200-kilowatt motor-driven exciter operate in conjunction with the generators. A 1440-horsepower synchronous motor is directly connected to a 1000-kilowatt generator which produces current for illuminating purposes. Plans have been formulated for the installation of a 1500-kilowatt motor-generator set at some future time.

Current from the generators passes to 15 oil switches, which are mounted in concrete compartments finished on the outside with white glazed brick, as shown in Fig. 2. Each compartment is equipped with a fireproof door, hinged at the top so that the lower part will flap out in case of an explosion. From the oil switches, the current is conducted to the copper bus bars which lead to four high-tension transformers mounted on the engine room floor at the south end of the building. These transformers step down the current from 6600 volts to 230-115 volts. Current at this voltage is used for the various blast furnace departments. Separate transformer stations are located at the coke oven and steel plant departments.

Auxiliary equipment, including the exciter breaker panels, generator field rheostats, lightning arresters, automatic starting transformer for the motor generator set, etc., is mounted on a mezzanine floor. A 60-cell storage battery is housed in a brick compartment on this floor and has a normal rating of 20 amperes when charging or discharging. The battery is used to operate the remote-controlled switches which are mounted on a 32 x 7½-foot monson slate switchboard. The battery is also used for emergency power-plant lighting and rheostat control. When the battery is run down it is recharged with current received from a 125-volt, motor-driven charging set.

All high pressure steam lines are equipped with a drainage system, which eliminates steam traps. The condensate passes into a receiver, connected to a 10 x 6 x 12-inch drain pump which returns the condensate through the heaters to the boilers.

Double Pass Recuperative Furnaces

Special Brick Used in the Construction of This Type of Furnace Heats the Incoming Gas Continuously and Eliminates the Reversing Valves Required in Other Heating Systems

REGENERATIVE furnaces have been the means of effecting immense savings of fuel in steel works practice. Since the introduction of these preheaters, few improvements have been made in their construction other than a few minor changes in the reversing valves, checker work, size of chambers, etc. That the recuperative furnace so far has not displaced the regenerative system, is due to the inability of the former type to withstand temperature between 1300 to 1500 degrees Fahr. for any length of time without undergoing repair. Since repairs to the heating system necessitate shutting down the furnace and in many instances the rebuilding of the furnace, it is further understood why the recuperative system met with disfavor heretofore among the steel makers in this country.

Operated Successfully in Europe

However, in Europe several recuperative furnaces are in successful operation and are worth investigating because they are built differently than the usual type of reheating furnaces. The recuperative furnaces previously mentioned are constructed of hollow brick blocks which are built with a male flange on one end and a female flange on the other as shown in Fig. 1. The walls of the bricks are 1⅛ inches thick. When several rows of blocks are placed adjacent, they form flues through which

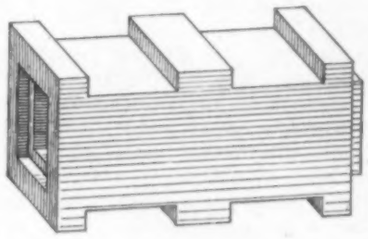


FIG. 1—SHAPE OF FIRE BRICK USED FOR RECUPERATOR FLUES

the products of combustion pass. Other courses are mounted on top of and parallel to the first row of blocks. Transverse flues are formed between the upper and lower surfaces of these blocks and it is through these flues that the secondary air is heated before mixing with gas.

The heating furnace shown in Fig. 2 is constructed on top of the recuperator. The gas enters the lower combustion chamber of the recuperator and flows to the rear where it commingles with preheated secondary air. Ignition takes place, the products of combustion passing down a vertical flue which connects with three horizontal channels. The gas passes through these channels to a vertical flue, and then returns through three lower rows of horizontal channels to a vertical flue. This flue directs the gas to the opposite side of the furnace where it passes zigzag through channels arranged similarly to those just described. The gas leaves the channels at the top of the furnace and is discharged into the air.

Ducts Heat Secondary Air

The secondary air is heated by passing through the ducts that are formed by the collars on the channel blocks when placed one upon the other. The air enters these ducts at that section of the furnace where the combustion gases are exhausted into the atmosphere. The air passes in a zigzag manner through these ducts until it reaches the bottom course where it is transferred to the opposite side. The temperature of the air is further increased by passing through another series of ducts which

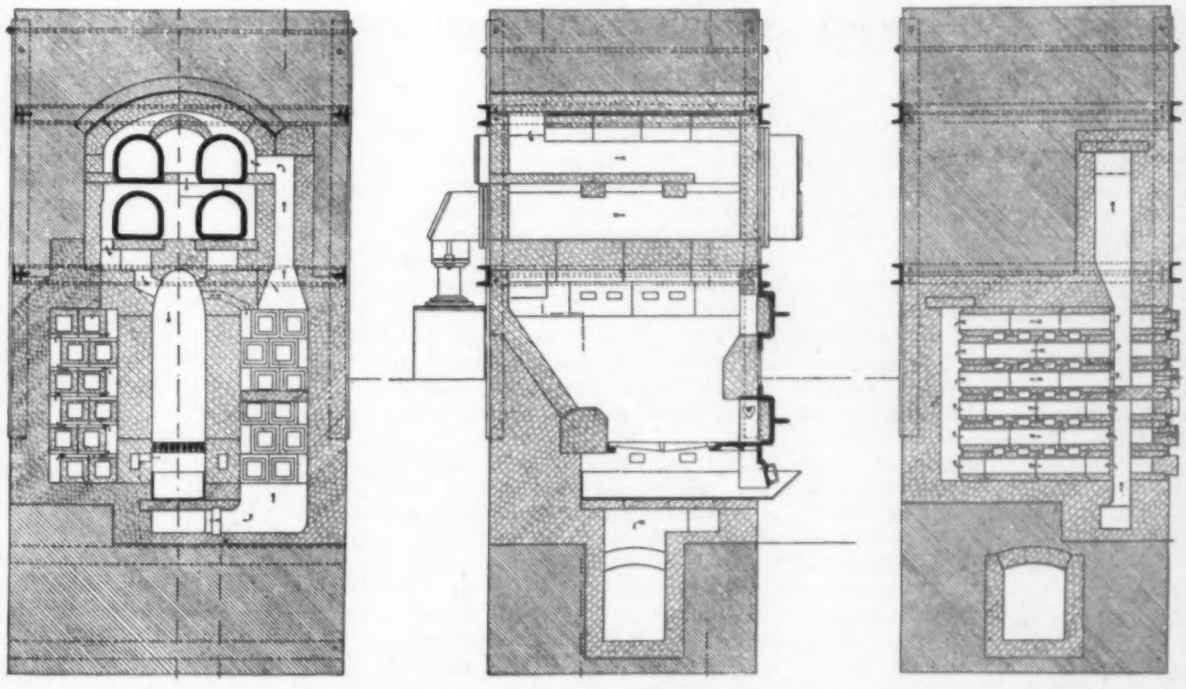


FIG. 2—FRONT, SIDE AND SECTIONAL VIEW OF RECUPERATOR FURNACE—ARROWS INDICATE THE COURSE TRAVELED BY THE GASES

discharge into a central chamber. From this chamber the air is directed to the combustion chamber and mixes with the incoming gas.

Recuperator furnaces, similar to the one previously described are used successfully at many iron and steel plants. When used in connection with puddle furnaces, the air for combustion passes into a chamber midway between the dome of the furnace and the gas chamber. This central chamber insures a uniform mixture of gas and air. The products of combustion pass to the recuperators underneath the furnace. The recuperators are further adapted for heating ingots, and in connection with forging, or annealing furnaces. In the last 10 years, fully 2000 recuperator furnaces have been installed in various manufacturing plans. The success of the recuperator furnaces is due largely to the elimination of reversing valves as required with other preheating systems, and the low cost of repair and operation.

Book Review

Modern Machine Shop Construction, Equipment and Management, by Oscar E. Perrigo; cloth; 384 pages, 6½ x 9½ inches; published by the Norman W. Henley Publishing Co. and furnished by THE IRON TRADE REVIEW for $5.00.

"The 'eternal fitness of things', as well as the spirit of this progressive age," according to the author, "requires that in whatever we design, build, equip and arrange . . . . we shall strive to make it the best of its class." It is not only "the eternal fitness of things", however, that makes it advisable today to have our plants constructed, equipped and managed in the most effective fashion possible. A high sense of patriotic duty ought to impel us to so arrange our shops that waste space, waste material, waste time, or any form of waste which ultimately will mean loss of production may be, as nearly as possible, avoided.

"Modern Machine Shop Construction, Equipment and Management" is divided into three parts, each of which takes up in detail one of the subjects indicated in the title. Section I describes the construction of a shop, giving first the general layout and, following this, descriptions of the various types of construction of the different buildings which make up the plant. Section II goes into details of the equipment necessary for a plant, giving the arrangement of tools and departments in a model shop. The plant is described as a whole and by departments, showing how arrangement and proper and adequate equipment can affect output.

Although the possession of a building of most approved design, outfitted with the most modern equipment is certaintly a long step toward securing a large output and a dependable product, these two alone are very inadequate without an efficient system of machine shop management to bind them together into a working unit. The third section of the book describes how this can best be done in the various departments and in the plant as a whole. Helpful diagrams and illustrations accompany the text throughout.

Metal Mine Ventilation

George S. Rice, United States bureau of mines, at the recent New York meeting of the National Safety council, summarized the need and importance of mechanical ventilation in metal mines as follows:

1. To provide good quality of air for the underground workers in all parts of the mine, including the face. The exception would have to be made for conditions at the face immediately after blasting, and then only for a short time, during which the miner must be kept out from the face for the sake of his health and for best interest of the mine operator.

2. To keep down the temperature of the mine air at the working place.

3. To provide a positive movement of the air in hot working places in order to keep down the bodily temperature of the worker and thus increase his efficiency.

4. To provide a positive circuit of air, so that in the event of fire the underground workers may escape by traveling against the fresh intaking air. This is, of course, provided the fire has not occurred in the intake. If it has, the only possible way of saving all the men is by the reversal of the fan.

Ten Years of Boiler Standardization

ONE of the most extensive efforts ever undertaken to effect standardization in any one line is at the present time reaching a successful climax. This great work, boiler standardization, had its inception in Massachusetts 10 years ago and in the intervening period, has claimed the attention of thousands of engineers and required an outlay of over $1,000,000. After the work was taken up by the American Society of Mechanical Engineers its advance was rapid under the stimulating energy of John A. Stevens and the late Col. E. D. Meier. At the present time the A. S. M. E. boiler code has been adopted by several states and power plants.

The history of boiler standardization for land and marine service is interesting. It dates back to the early efforts of the Massachusetts board of boiler rules, founded mostly through the efforts of Joseph H. McNeill, which held its first meeting at the State house, Boston, in 1907. This board formulated a standard designed primarily to insure safety. Information on boilers was collected from a wide variety of sources by the board and bulletins were occasionally issued to boiler manufacturers and inspectors. A set of rules issued on Aug. 5, 1909, was the last and most important of the bulletins issued by the Massachusetts board.

In 1911, Col. E. D. Meier, then president of the American Society of Mechanical Engineers, suggested that the society undertake the work of standardization of steam boilers in a more complete manner than was possible by the state of Massachusetts. A committee was accordingly appointed with John A. Stevens, who had made a comprehensive survey of boilers in Europe and America, as chairman. This committee proceeded on lines similar to those followed by the original Massachusetts board and consulted all qualified authorities, including manufacturers and users of boilers. Bulletins showing the status of the work were published periodically and distributed.

At the present time the A. S. M. E. code specifies in detail the chemical and physical properties of all material entering into the construction of boilers, and gives rules, formulas and tables which have been checked and rechecked by men of national reputation and in many cases verified by testing laboratories. In many cases, rules or formulas were withheld until actual test in laboratories had been made in order to prove the mathematics. The code had been adopted, or is in the process of adoption at the present time in New York, New Jersey, Pennsylvania, Ohio, Indiana, Michigan, Wisconsin, Minnesota and California.

The code is used as a text book in the following schools: Stevens Institute of Technology; Sheffield Scientific School of Yale University; Rensselaer Polytechnic Institute; University of Virginia; Georgia School of Technology; University of Texas; The Tulane University of Louisiana.

Steel Export Volume Rises Sharply

October Figures of Overseas Shipments Reach 557,138 Tons, an Increase of 66,817 Tons Over September—Semi-Finished Tonnage is Enlarged, Greatly Reflecting Continuation of Heavy Foreign Demand for Manufacture of Munitions

OCTOBER statistics of foreign trade in iron and steel, compiled by the bureau of foreign and domestic commerce, show a substantial recovery from the pronounced decline in September. The official figures show that exports of iron and steel climbed to 557,138 tons during October, thus comparing favorably with the September tonnage of 482,311. Although the aggregate tonnage still is less than during October of the preceding year, there is every indication that the total figures for the calendar year will be well above that for 1916. This is borne out by the increase of 66,817 tons shown in October.

Chief among the iron and steel products to display a marked increase were steel billets. This gain by far was the greatest in any single line.

IRON ORE IMPORTS, GROSS TONS

	October,		Ten months ending October,	
	1917	1916	1917	1916
Spain	3,264	14,168	150,203	139,175
Sweden	3,692	12,378	61,121	178,909
Canada	28,509	5,142	137,037	135,766
Cuba	56,500	60,000	402,968	589,841
Oth. countries		4,150	29,038	81,745
Total	91,965	95,838	780,367	1,125,436

EXPORTS, GROSS TONS.

1916	Pig iron	Semi-finished material
Jan.	19,319	55,315
Feb.	15,061	87,406
Mar.	19,439	107,674
Apr.	18,518	88,764
May	28,293	142,782
June	48,770	116,316
July	28,718	135,827
Aug.	60,264	160,921
Sep.	64,122	163,104
Oct.	92,756	162,669
Nov.	102,786	125,038
Dec.	105,195	162,901
1917		
Jan.	69,146	183,656
Feb.	49,018	131,566
Mar.	69,629	193,469
Apr.	44,783	162,209
May	61,112	168,158
June	81,999	192,133
July	32,368	112,085
Aug.	62,083	189,083
Sep.	44,287	148,932
Oct.	47,200	204,724

During October exports of this product totaled 204,724 tons, as compared with 148,932 tons shipped abroad during September. The enormous demand created abroad for steel of this character is demonstrated in the total of 1,677,364 tons for the 10 months ending with October, 1917. The increase of approximately 450,000 tons over the same period of the preceding year likely is a measure of the greater preparations for offensive power by the allies.

Pig iron also was among these products to show an increase over September, which although not large is typical of the movement of a majority of the products on the list. Pig iron exports for October aggregated 47,200 tons as contrasted with 44,287 tons in September. The October pig iron export figure is less by approximately one half than that of October, 1916, when the total was 92,756 tons. The aggregate for the 10

IRON AND STEEL EXPORTS, GROSS TONS

	October,		Ten months ending October,	
	1917	1916	1917	1916
Scrap	6,031	19,994	142,342	178,346
Pig iron	47,200	92,756	562,969	395,260
Steel billets, ingots and blooms	204,724	162,669	1,677,364	1,220,778
Wire rods	26,581	13,927	142,151	132,414
Steel rails	48,531	52,753	422,453	444,202
Steel bars	46,771	64,132	517,539	653,330
Iron bars	4,823	4,512	44,384	63,688
Struc. iron and steel	20,776	25,342	243,222	237,211
Hoops, bands and scroll	5,637	3,369	47,332	36,621
Sh'ts & plates	65,761	36,714	558,535	310,593
Tin and terne plate	15,317	14,195	188,004	193,342
Barbed wire	10,616	37,615	149,513	379,526
All oth. wire	18,035	18,512	163,670	230,698
Cut nails	329	541	3,339	4,204
Wire nails	13,659	13,202	88,028	127,911
All oth. nails incl. tacks	1,877	1,558	17,152	9,282
Pipes and fittings	14,396	22,681	167,784	183,847
R. R. spikes, bolts, nuts, rivets and washers	5,012	3,951	43,034	46,012
Horseshoes	813	222	7,229	7,251
Cast radiators	249	247	4,673	2,106
Total	557,138	588,892	5,190,717	4,856,622

months ending October, 1917, however, is 562,964 tons, or approximately 100,000 tons larger than for the same period of the year preceding.

Tin and terne plate exports were 15,317 tons, or larger by 3722 tons than during September. Exports of these products for the 10-month period were 188,004 tons. Wire rods totaling 26,581 tons were exported during October. This was an increase of 10,688 tons over September. Scrap exports for October were 6031 tons, an increase of 4572 tons. For the 10-month period ending October, 1917, however, scrap exports were 142,342 tons, which is approximately 36,000 tons less than for the same period of 1916.

The valuation of exported iron and steel products which for the past few months steadily has been increasing, continues to grow. The official figures show that the valuation of all exported iron and steel products for October was $114,196,743. This valuation is greater by approximately $7,000,000 than that for September, and exceeds the October 1916 figure by more than 40 per cent. The valuation of these exported products for the 10-month period in 1917 was $1,025,623,521.

IRON AND STEEL IMPORTS, GROSS TONS

	October,		Ten months ending October,	
	1917	1916	1917	1916
Scrap	4,894	11,748	172,120	59,520
Pig iron	4,873	14,829	68,230	112,625
Steel ingots, bl'ms & billets	3,116	2,481	37,688	22,253
Wire rods	3	183	518	3,467
Rails	668	493	7,068	24,931
Bar iron	2	220	2,099	6,965
Structural	591	32	4,646	1,113
Sheets & plates	78	73	1,412	1,384
Tin & terne plate		110	124	936
Total	14,225	30,169	293,905	233,194

Iron ore imports were 91,965 tons in October compared with 74,873 tons in September. The imports of iron ore for the 10-month period ending October, 1917, were 780,367 tons. These imports are considerably less than during the corresponding period of last year, when 1,125,436 tons were brought in. Of the iron ore imported in October, Canada and Cuba supplied the major part. Importations from Cuba totaled 56,500 tons, an increase of approximately 15,000 tons over the preceding month, while receipts from Canada were 28,509 tons, likewise an increase over September.

IMPORTS AND EXPORTS, GROSS TONS.

1915	Imports	Exports
July	20,858	380,340
August	27,556	405,949
September	23,345	382,113
October	34,318	349,843
November	37,131	362,764
December	35,408	353,853
1916		
January	15,824	360,102
February	20,279	368,980
March	15,159	438,649
April	20,176	384,452
May	32,114	538,657
June	26,885	515,214
July	14,774	502,330
August	23,255	571,401
September	25,559	643,762
October	30,169	588,892
November	42,545	554,856
December	44,134	580,957
1917		
January	40,192	608,105
February	24,379	449,099
March	37,280	606,559
April	48,213	519,397
May	26,013	588,514
June	28,419	614,600
July	28,859	357,776
August	22,635	519,518
September	20,196	482,311
October	14,225	557,138

Austrian Labor Unmoved

War Declaration Likely to Cause Little Disturbance to Iron and Steel Industry According to Advices from Different Districts

WITH orders from Provost Marshal General Crowder recalling all Austro-Hungarians and other nationalities owing allegiance to the Austrian flag from draft camps and prohibiting acceptance and entraining of any enemy aliens, the question confronting large employers of labor is how they will be affected not only by the declaration of war upon Austria-Hungary, but by the potential labor increase resulting thereby.

In the Youngstown steelmaking district, little apprehension is shown, since for a long time the unnaturalized Austrians and Hungarians have been, for the most part, cognizant that the material they were assisting to produce would be used against their native countries, and no difficulty has been experienced. Every proper precaution, nevertheless, is being exercised.

Practically the same degree of assurance is felt in the Lake Superior mining territory. Because such a large percentage of the labor has been made enemy-alien automatically, and because steady employment has been enjoyed for so long and is in prospect, it is believed no disturbances need be expected. The alien miners long have known the purposes to which most of the ore is being applied.

Labor in the Pennsylvania coal centers likewise is made up largely of former citizens of Austria, Hungary, etc. While some employers are inclined to believe these men should be carefully watched because of possible outbursts of patriotism for their mother country, expectations generally are that these men will cause little trouble, while it remains to be seen just what the effect of the war declaration will be, the feeling in these three major lines of industry points to the fact that the new addition to the formal enemies of the United States is not likely to exercise any considerable effect on labor.

Will Insure Employes

E. P. Cooper, manager of the Anniston, Ala., plant of the Central Foundry Co., has announced that each employe who has been in the company's service for one year prior to Nov. 1 will have carried for him an insurance policy, free of cost. The minimum policy is $500 and the amounts range up to $1500, according to the wages. The policy is issued regardless of the condition of the man's health and upon his death from any cause while in the employ of the company the amount called for goes to his family.

British Women Performing Men's Work Well

Word from the labor supply division of the British ministry of munitions, indicates that women are successful substitutes for the men now serving in the war, to a greater extent than is generally known. Operations in machine shops now performed by women include the following:

Cutters: Operating backing-off lathe, turning on turret lathe, all grinding operations, drilling, and blasting and annealing.

Dies and punches: Operating turret, capstan and center lathes, precision grinders and drilling machines, turning-in chucking lathe, turning, boring, facing and reaming.

Drills: Parting off, turning on center lathe, grinding and fluting twist drills.

Test pieces: Operating lathes, bending, shearing, planing, shaping and drilling machines and precision grinding machines upon test pieces of all kinds.

Many other jobs, which it was thought formerly could only be handled by men are even more efficiently carried on by the women.

To Check Up Bidding

An effort to stabilize labor in Pennsylvania has been commenced by the Pennsylvania state war board, under the leadership of Edgar C. Felton, former president of the Pennsylvania Steel Co. Labor bureaus are to be opened in each city of 20,000 or over and competitive bidding for labor will be eliminated. The last legislature awarded this board $2,000,000 from which all expenses will be paid, which now are estimated as $25,000 a month.

Molders Make Demands

Union iron molders employed in every plant in Worcester, Mass., have made a demand upon their employers for an increase of 50 cents a day in wages, no date being set on which they wish it to become effective. The men are now receiving $4.25 a day. The manufacturers have decided they will not grant the demands unless the molders show a desire to make some concessions, especially as to the number of apprentices that shall be employed in a foundry.

Labor Notes

Women are being employed in the government arsenal at Watertown, N. Y., for rough machine work.

Large employers of labor in the Cleveland district have successfully substituted colored women for boys and Slavish or other alien women.

Efforts of the I. W. W. agitators in Kansas oil fields are being curtailed as more than 50 of the 100 rounded up by federal authorities are being held, pending thorough investigation.

American Steel & Wire Co. reports that serious inroads have been made by the war on the clerical and mechanical force of its Fairfield, Ala., plant.

The employes of the Pittsfield, Mass., branch of the General Electric Co. unanimously have voted to reject the company's offer of a 5 per cent wage increase and insist on a 10 per cent increase with no conditions.

All employes of the Drifton shops of the Lehigh Valley Coal Co., Hazelton, Pa., have been granted a wage increase. Men getting more than $1.54 a day have been given an advance of 90 cents, and those paid less than $1.54 an advance of 60 cents.

On its refusal to grant an increase of from 50 to 75 cents per day the union molders employed by the Clinton Foundry Co., Clinton, Mass., struck recently. The company is not inclined to pay all men alike and offers to treat with them as individuals.

The industrial committee of the North American Civic League for Immigrants, 173 State street, Boston, Mass., has put into foreign languages drafts of those presidential proclamations which it believes ought to be brought to the attention of non-English speaking workmen. Employers of foreign-speaking workers are requested, for patriotic reasons, to order and distribute these circulars which are published in English, Italian, Greek, German, Portuguese and Polish.

Propose Pig Iron Subsidy

British Ministry Suggests Allowance to Producers Instead of Price Advance—American Billets Quoted $67.20, New York

Bureau of THE IRON TRADE REVIEW,
Prince's Chambers, Corporation St.,
Birmingham, Eng., Nov. 26, 1917.

THE question of prices of iron and steel has developed in an unexpected direction. Several pig iron makers have received from the ministry of munitions, in reply to applications for higher selling prices, a suggestion to settle the matter on the basis of the present scale with the allowance of a subsidy to producers. This latter is to compensate him for the additional cost of productioin involved by dearer coke and other increased expenditures. Pig iron makers lately have considered about £1 ($4.80) per ton as a proper advance to cover extra expenditures on coke, wages, etc. The amount now mentioned by the ministry is 18s ($4.32). This is regarded as a likely compromise, as far as the amount is concerned. But the idea of a subsidy is not altogether acceptable, especially in view of the fact that a retrospective clause will carry back into September whatever concession is made by the ministry.

The idea seems to be that if the finished ironmaker pays no more for his pig iron, he will have no very strong claim for a revision of his rates. In all directions, moreover, there is a very earnest desire to avert any considerable advance in wages, which are regarded as much too high already. The answer of the smelter and ironmaster is that if wages were meant to be kept down, the last application for a rise in miners' wages should have been refused. As the government now is the buyer of practically all the pig iron made, it can manage the subsidy very readily.

Transactions in pig iron, for the time being, so far as the Midlands are concerned, are few and far between. Dealers are well filled on orders and consider it best to sell as little as possible. Many of them have no iron to sell. New customers have no chance of getting iron, and regular buyers have to submit to a proportionate rate allotment of the tonnage they want, according to the importance of the order.

In the Cleveland district, sales are restricted to small lots. Stocks of standard iron both in makers' yards and in warrant store are small. There is a larger surplus of iron available for shipment to the allies, but the real task is to find ships. The condition of scarcity which has prevailed in the east coast hematite trade is as great as ever. Certain furnaces which will supplement the supply are approaching completion, and it is hoped may be started before the end of the year. Prices are unchanged.

Steelmakers Don't Like It

Finished ironmakers are deeply interested in the proposal to subsidize the pig iron makers. The matter has been brought to a head by the demand of makers of all kinds of finished iron for an increase. Undoubtedly, the claim of the finished maker to a higher selling price would be weakened by the pig iron subsidy scheme. Most finished irons and steels had their prices fixed over a year ago, and there have been several increases in wages since, with important additions to the cost of pig iron, and practically all the materials used in production. It was from this standpoint that the ironmaster mentioned a rather large sum as the amount which ought to be added to the selling price. He is not likely to cut down his claim greatly.

From another point of view, the finished ironmaker regards the project unfavorably. He is quite anxious to avoid the payment of higher wages, and would therefore welcome the maintenance of the present price. At the same time, he knows his workmen too well to expect that the claim for increased wages will be averted by a scheme calculated to check the natural operation of the sliding scale. The ironmaster has, for many years, prided himself upon the automatic character of the sliding scale, which has had a large share in the avoidance of friction in regard to wages. It would be regarded as a serious thing if the sliding scale no longer faithfully reflected the real fluctuations of the market.

There are increasing complaints of scarcity of steel. Some finishing mills, especially in South Wales, have found it quite impossible to get billets and bars enough to keep themselves fully employed. One of the most important works in the principality has lost some of its workmen, who object to short time employment. Under these circumstances the desire for relief has led to more inquiries in the direction of the United States, but without any satisfaction so far. British users do not see their way to pay more than £12 10s ($60), delivered, for billets. The best quotation lately received was £14 ($67.20), c.i.f. New York. A day or two after this, however, the merchant interested was informed that the price shortly much more likely would be £18 ($86.40). For the time being, all such negotiations are off. Every effort is being made to increase home steel production. The tin plate trade continues busy with most of the works well booked forward in spite of the high prices. The sheet trade is busy very largely on material for use by British and American troops in France.

Motion Pictures

Of Ore Loaders Exhibited in Cleveland—Two Types Shown

Two new forms of ore loaders are shown in a 1000-foot film prepared for the Tod-Stambaugh Co., Cleveland, by the Industrial Scientific Film Co., also of Cleveland. The pictures show the machines in operation and details of the mechanism are displayed in "close-ups".

The first type, known as the Billings shovel-type loader, duplicates closely the action of a human shoveler in scooping and throwing material in a perpendicular arc from the ore pile into a car. It operates at a speed of eight strokes per minute, carrying from 200 to 400 pounds at each shovelful. The machine is anchored to the track in front of the car to be filled, and the shovel may be operated 9 feet to either side. Its forward motion of 4½ feet is impelled by a thrust of five tons. The machine may be operated under low head room, inasmuch as the length of the forward or horizontal motion is relatively independent of the perpendicular motion by which the material is thrown into the car. It is claimed a 2-ton car may be filled in two minutes.

The second loader exhibited by the film differed widely from the first in principle. It is known as the hoe-type loader. Its action may be described as similar to that of pulling material upward with a floor-brush into a dust pan or chute. The portion of the machine which resembles the floor-brush drags the ore to the top of the chute from which it drops onto a belt conveyor. This conveyor carries the ore up and drops it into the car directly behind the loader. The rear of the loader is rigid with respect to the ore car, while the hoe and chute portion swings in a semicircular horizontal arc. The extreme reach of the hoe is 6 feet. The elevation of the chute above the track may be readily modified.

Ingot Output

Drops in November, But is Above Year's Average

Steel ingot production in November, as reported by the American Iron and Steel institute, was 3,166,257 gross tons. The output in October was 3,351,935 gross tons, showing a loss in production last month of 185,678 gross tons. The average daily output in November was 105,542 tons, against an average daily production of 108,127 tons in October.

These figures are secured by the institute from 29 steel companies which in 1916 produced 88.14 per cent of the country's total output. These companies during the first 11 months of this year have produced 34,453,603 gross tons, an average of 3,132,146 tons monthly. The November production of 3,166,257 gross tons compares with an average monthly production during the first six months of the year of 3,150,137 tons; with an average monthly output during the third quarter of 3,011,530 tons, and with the average monthly output of 3,132,146 tons during the first 11 months of this year.

The institute, on the basis of the reports which it is receiving, estimates that the country's total ingot production in 1917 will be 42,600,000 tons.

The detailed record of ingot production is as follows:

	Total first six months	Third quarter July-Sept.	Total first nine months
Open hearth	13,681,483	6,599,048	20,280,531
Bessemer ...	5,164,139	2,411,108	7,575,247
Other	55,198	24,435	79,633
Total	18,900,820	9,034,591	27,935,411

	October	November	Total eleven months
Open hearth	2,475,754	2,384,218	25,140,503
Bessemer ...	870,494	772,489	9,218,230
Other	5,687	9,550	94,870
Total	3,351,935	3,166,257	34,453,603

Show Plants in Movies

Under the direction of the Carnegie Steel Co., motion pictures of the Liberty plate mill, Homestead, Pa., the McDonald mills and town erected near Youngstown by the Carnegie company, as well as other industrial scenes have been taken. These were displayed in Youngstown recently to plant superintendents and their families, with J. H. Gross, superintendent, explaining the films. It is expected that this from of publicity will be extended in the near future. Other pictures will be taken and the films shown in different sections of the country.

The John Wood Mfg. Co., Conshohocken, Pa., has leased a large gas holder from the Counties Gas & Electric Co., and will pipe gas from this holder to the Wood plant. The Wood company, which uses great quantities of gas in its welding department, formerly obtained its supply from the Supplee plant, Conshohocken, which was badly damaged some time ago.

Holland Plans Furnace

Blast furnace production in Holland will soon receive considerable impetus when the furnace it is now planned to erect on the Hook of Holland is completed. It will have an output of 150,000 tons a year and according to consular reports 120,000 tons of that will be used by the shipbuilding industry. Importation of ores and coal will be a comparatively easy matter, because of its location on deep water, although sufficient bituminous coal will soon be mined in Holland. The Dutch government has taken a block of the stock.

Plans to Build New Tube Mill at Warren, O.

Plans for the mill and equipment needed for the new tube plant to be erected in Warren, O., by the International Steel Tube & Rolling Mills, Inc., will be ready soon after Jan. 1, according to the announcement of C. H. Hopkins, 435 Guardian building, Cleveland, who is secretary and treasurer of the corporation. The capitalization will be $2,500,000.

Lap-weld boiler tubes will be the sole product of the 50-ton mill at first, while later the output may be varied. Including machinery, the plant is to cost about $400,000. W. H. Creahan, formerly identified with Montreal and Youngstown steel interests and Spang, Chalfant & Co., Pittsburgh, is to be general superintendent.

Moving an Old Blast Furnace

The Tennessee Valley Iron & Railroad Co., which recently purchased the Star & Crescent iron furnace at Rusk, Tex., now is engaged in moving the plant to Collinwood, Tenn. The Tennessee Valley Iron & Railroad Co. has a large acreage of brown ore lands and will supply its furnace from the old Wayne Furnace and Shawanee mines. An abundance of limestone is close at hand. Charcoal which will be used as fuel will be made from the company timber holdings. A modern chemical plant, capable of burning 225 cords of wood per day will be installed to make the charcoal. A brick plant also is to be built.

New Records

Established by Lead and Zinc Production First Half of 1917

Record of production of lead and spelter is shown in the geological survey's final report for the first half of 1917. According to the statement, the output of spelter from foreign and domestic ore aggregated 361,138 tons, as compared with 351,004 tons in the last half of 1916 and 316,432 tons in the first half. In addition to this was spelter redistilled or recovered from ashes and drosses, which boosted the total production to about 385,000 tons, or at the rate of 766,000 tons a year. The total output of refined lead was 306,062 tons, or at the rate of 612,124 tons annually, against 571,134 tons in 1916 and 550,055 tons in 1915.

The apparent consumption of spelter fell off about 8000 tons, the total required by consumers being approximately 221,400 tons. In lead, only an approximation is made in the report as to the metal consumed, owing to the absence of any statistics of stocks. The estimate is 268,995 tons, indicating the consumption for this year at 538,000 tons, as compared with 461,173 tons in 1916, and 419,558 tons in 1915. The stocks of spelter at the end of the period were 33,147 tons, against 17,598 tons on Jan. 1, 1917.

Exports of both zinc and lead underwent a decline, as shown as follows:

EXPORTS
(In short tons.)
ZINC

	Last half of 1916.	First half of 1917.
Domestic origin	105,130	93,600
Foreign origin	23,033	30,691
Total	128,163	124,291

Note: Exports of spelter of foreign origin include spelter exported from bonded warehouse and articles exported with benefit of drawback.

LEAD

	1916.	1917. first half.
Exports of domestic lead....	100,565	29,241
Exports of foreign lead:		
From bonded warehouse...	9,880	6,066
In manufacture, under drawback	5,171	3,227
Total	115,616	38,534

Imports of spelter dropped from 94,127 tons in the last half of 1916 to 49,095 tons, but in lead, there were 30,310 tons shipped to this country during first half of this year, as compared with 35,330 tons for all of 1916.

A feature of the period was the large gain in the price of lead, which advanced from 7.5 cents to 12.25 cents and averaged for the six months at 9.9 cents, ore one-tenth higher than the average for spelter.

Raw Material Board Reorganized

Directors of Various Divisions Handling Unmanufactured War Supplies Named to Correct Situation Caused by Lever Bill—Government Clamps Lid Further on Trading With Firms of Enemy Character

WASHINGTON, Dec. 11.—The council of national defense last week announced reorganized raw materials division of the war industries board in accord with plans announced in THE IRON TRADE REVIEW several weeks ago. The reorganization establishes directorates of the various branches of the board under supervision of Bernard M. Baruch and makes them similar to the position held by J. Leonard Replogle, director of steel supply.

Personnel of New Division

L. L. Summers, New York, has been made director of explosives; Eugene Meyer Jr., New York, director of nonferrous metals and cement; J. F. Guffey, Pittsburgh, of oil; R. H. Downman, New Orleans, of lumber; G. E. Merryweather, Cleveland, of machine tools; G. E. Chattillon, New York, of small tools; S. M. Vauclain, Philadelphia, of manufacture of finished products; Julius Rosenwald, Chicago, of supplies of finished products; Walter Robbins, St. Louis, of electrical equipment; A. L. Scott, Boston, of cotton duck; Arthur W. Lawrence, Boston, of shoes; Alexander C. Brown, Cleveland, of locomotive cranes; Charles Eisenman, Cleveland, of fabrics; A. D. Edington, Boston, of wool; and H. L. Horning, Waukesha, Wis., of automotive products.

The reorganization comes as a direct result of the Lever bill, section 3 of which forbade any person with business connections serving in any capacity by which his business might profit. The establishment of directorates does away with advisory committees. The latter are left to become representatives of their respective industries through which the directors may obtain advice and information.

Enemy Firms Barred From American Trade

Washington, Dec. 10.—An enemy trading list containing 16,000 Latin-American companies and firms with whom it has been made illegal to trade without a license, has been compiled by the war trade board. The board now is engaged in compiling a list of nonenemy firms which may fill the place of those firms or companies which have been debarred from trading with this country. The war trade board also has repeated its warning relative to re-consignment of goods to branches or agents abroad. When the board originally made an announcement of this kind some weeks ago it stipulated the agreement which must be signed by manufacturers and exporters before a license was granted. It now states that signing of this agreement does not necessarily mean that licenses will follow.

"The form is prepared by the bureau of exports to meet the requirements only of those shippers who have been in the habit of carrying stocks abroad with their own branches," says the board. "Shippers should bear in mind there is more than the legal obligation resting upon them when they sign this contract, and they will be asked to show any proof they may have that it can be carried out. The mere signing of the contract without furnishing of any proof that its provisions can be carried out by the consignor would render the contract useless so far as the purposes of the bureau of exports are concerned."

Proposes Higher Rate of Duty on Imports

Washington, Dec. 10.—An effort to increase the present rate of import duty is represented by a resolution introduced in the senate by Senator Jacob H. Gallinger of New Hampshire, which declares that the present rate of about 8 per cent, or the lowest in the history of the country, falls short in protecting adequately either American industry or American labor. In the 10 months preceding the war, the balance of trade to the United States was reduced by $260,866,122, or approximately 43 per cent according to the resolution. In the fiscal year 1917 the imports were $850,000,000 greater than in the year before the war, but the revenue in 1917 was $92,000,000 less than in 1913, it is further stated.

Anticipating after-war conditions, the resolution concludes "that in view of existing conditions, as well as in anticipation of the industrial conditions that will necessarily exist at the close of the war in which we are engaged it is the duty of the congress of the United States, without delay or hesitation, to place on the statute books a law that will protect all classes of our people, and especially the laboring and agricultural classes, from the disastrous effects of an inundation of foreign-made goods and products."

Seek to Protect Country's Supply of Gold

Washington, Dec. 10.—Preservation of the country's gold supply by increasing the production of silver for the settlement of balances of trade with silver-using countries, is sought in a joint resolution now being considered by the house and senate committee on banking and currency. This authorized the President to appoint a commission of three members to visit our allies and neutral nations with the plan in mind of affecting an international agreement as to the coins of silver which will be subject to approval by congress. October gold imports were only $4,000,000, while exports were $11,000,000. The 10-month period ended with October showed gold imports of $532,000,000 against $480,000,000 for a similar period in 1916. Exports were valued at $360,000,000 compared with $101,000,000 for the first 10 months of 1916. Silver imports in October amounted to $5,000,000 and to $38,000,000 for the 10 months, and exports were $7,000,000 and $60,000,000 respectively for the two periods. Stabilization of the price of silver is desired by the government. Data as to the cost of production have been submitted to R. T. Baker, director of the mint.

May Continue Business

Washington, Dec. 10.—A license has been issued by A. Mitchell Palmer, alien property custodian, to the Orenstein-Arthur Kopple Co., Kopple, Pa., which is entirely owned by German capital, to continue to conduct its business under the present name and management. T. Hart Given, president of the Farmers Deposit National bank, Pittsburgh, will exercise a supervision and control the business as a representative of Mr. Palmer.

Men of the Iron Trade

Personal News of a Business Character Regarding the Men of Affairs of the Industry

GEORGE N. PEEK, vice president of Deere & Co., Moline, Ill., manufacturers of farm implements, has been appointed industrial representative of the war industries board, in charge of what is practically a bureau of manufacturing resources, looking toward the utilization of plants not engaged in producing materials for the making of some essential war product. Mr. Peck, who is a director, member of the executive committee and a voting trustee of Deere & Co., and who represents the implement industry on the executive board of the National Implement and Vehicle association, has been empowered to select his assistants, subject to the approval of Chairman Willard of the war industries board. He will meet manufacturers whose plant facilities may be used in the production of war supplies and take up with them the questions involved in changing over their plants and equipment.

Walter C. Allen, president, Yale & Towne Mfg. Co., New York, has been granted a leave of absence to enable him to respond to the call of the United States government for service in France. It is expected that a commission as major in the signal corps will be granted Mr. Allen, who will leave shortly for France to take up the duties assigned to him.

Jerome F. Gunther of the Brown & Sharpe Mfg. Co., Providence, R. I., has been appointed accountant in the finance division of the ordnance department, U. S. A., Washington.

George M. Hendee, formerly president of the Hendee Mfg. Co., Springfield, Mass., arrived in France recently, where he went to engage in Y. M. C. A. work.

John P. Ilsley has been made general manager of the Hecker Milling Machine Co., Hyde Park, Mass. Mr. Ilsley was formerly affiliated with the Niles-Bement-Pond Co., New York.

James L. Ashley, secretary and treasurer of the International Nickel Co., New York, has been elected a director of the American Bank Note Co., New York.

G. Wickersham, formerly vice president and general manager of the Diamond Forging & Mfg. Co., Pittsburgh, now holds those same offices with the Louisville Steel & Iron Co., Louisville, Ky.

E. L. C. Clark has been appointed works manager of the tractor branch

WALTER C. ALLEN
President, Yale & Towne Mfg. Co., who has been granted leave of absence to do government service in France

of the Moline Plow Co., Rock Island, Ill., severing his connection with the New England Westinghouse Co., Springfield, Mass.

Carl R. Gray, president of the Western Maryland railroad, has resigned as head of the Maryland council of defense and chairman of its executive committee. His appointment to the operating committee of the eastern railroads necessitates his spending the greater part of his time in Pittsburgh.

J. A. House, Cleveland, has decided not to accept the position of finance director offered him last September by M. A. Hanna & Co., since the directors of the Guardian Savings & Trust Co., have prevailed upon him to accept the presidency of that institution.

C. Birdsall Smith, formerly treasurer of the Cleveland Furnace Co., Cleveland, is now a partner of Edward S. Bassett; business and financial counsellor, 1021-23 Guardian building, Cleveland.

L. B. Moses, formerly sales manager of the Kettle River Co., Minneapolis, has been appointed 2nd vice president of the Walter A. Zelnicker Supply Co., St. Louis. Mr. Moses will have charge of the rail department.

F. W. Chriswell, formerly of Seattle, has charge of the office at 828-830 Woodward building, Washington, opened by the Pacific Coast Steel and the Pacific Car & Foundry companies, both of Seattle.

Morris C. Hamilton, Hartford, Conn., has been appointed consulting and resident engineer of the Housatonic dam, to be built for the Housatonic Power Co., in that state, by C. W. Blakeslee & Sons, New Haven, Conn.

W. C. Greer has been appointed general foreman of the casting plant of the Leetsdale Foundry & Mfg. Co., Leetsdale, Pa. Mr. Greer was formerly superintendent of the foundry operated by the Railway Supply & Equipment Co., Seward, Pa.

Douglas P. Cook, vice president and manager of the Boston Pressed Metal Co., Worcester, Mass., has been elected president of the National Pressed Metal association, an organization of the leading manufacturers of stamped and pressed metal.

A. H. Jameson, now affiliated with the Malleable Iron Fittings Co., Branford, Conn., has been elected vice president and general manager of the Bayonne Steel Casting Co., Bayonne, N. J., and will assume his new duties Jan. 1.

Charles T. Bragg, formerly chemical engineer of the Ohio Brass Co., Mansfield, O., will be works manager after Jan. 1 of the Detroit plant of the Michigan Smelting & Refining Co. Prior to six-year affiliation with the Ohio Brass Co., Mr. Bragg was technical director for Berry Bros., Detroit. He is a past president of the Detroit section of the American Chemical society.

Howard G. Benedict, who has been works manager of the Aeromarine Plane & Motor Co., Keyport, N. J.,

Men of the Iron Trade

Personal News of a Business Character Regarding the Men of Affairs of the Industry

has accepted a similar position with the Glenn L. Martin Co., 419 Guardian building, Cleveland, manufacturer of air craft.

Charles F. MacGill, formerly efficiency engineer for the Remington Arms & Ammunition Co., Bridgeport, Conn., has become associated with the Bullock Engineering Works, Inc., Bridgeport, Conn., in its engineering department.

Felix B. Atwood, who for the past six years has been affiliated with the Osborn Mfg. Co., Cleveland, has accepted a position with the Springfield Facing Co., Springfield, Mass., manufacturer of foundry facings and supplies.

J. H. Schneider, formerly assistant superintendent of the plant of the Gurney Electric Elevator Co., Honesdale, Pa., in charge of special organization and engineering work, has been appointed chief of the efficiency department of the American Tool Works Co., Cincinnati.

Frederick W. Lucht Jr., formerly connected with the engineering staff of the Denver Engineering Works Co., Denver, now is affiliated with the tool design department of the Packard Motor Car Co., Detroit, in connection with production of the Liberty motor.

O. P. Blake, formerly manager of sales at St. Louis for the Inland Steel Co., Chicago, has been transferred to Washington, since his company has opened an office in the Wilkins building for the purpose of cooperating more closely with the government.

B. F. Affleck, Chicago, president of the Universal Portland Cement Co., was re-elected president of the Portland Cement association at its annual meeting at the Hotel Biltmore, New York, Dec. 12. F. W. Kelley, president, Helderberg Cement Co., Albany, N. Y., was elected first vice president; Richard Hardy, president, Dixie Portland Cement Co., Chattanooga, second vice president; and G. S. Brown, president, Alpha Portland Cement Co., Easton, Pa., treasurer.

E. R. Perkins, connected with the Allegheny Steel Co. since 1902, when he was affiliated with the sales department, has been made assistant general manager at Brackenridge, Pa. Until his recent promotion and since 1912, Mr. Perkins was superintendent of the plate mill.

Frank A. Scott, Cleveland, who recently resigned as chairman of the war industries board, will leave shortly for California for several months' rest, after which he will resume his duties as vice president and treasurer of the Warner & Swasey Co., Cleveland.

Howard Emery, general manager of the Manitowoc, Wis., plant of the Aluminum Castings Co., Cleveland, has been promoted to the position of general manager of the company's plant at Detroit, and will assume his new duties Jan. 1. The name of his successor at Manitowoc has not been announced.

D. S. Apeldorn, of Apeldorn & Beatty, Philadelphia, addressed the Philadelphia Foundrymen's association Dec. 5, on the subject of "Gas for Power, Lighting and Drying Cores". The Electric Furnace Construction Co., Finance building, Philadelphia, has been proposed for membership in the association.

Norton A. Booz, formerly secretary of the Machinists' Supply Co., Pittsburgh, has recently been promoted to the position of vice president and manager. His duties as secretary of the Machinery Club of Chicago, have been assumed by James S. Dodd of the Charles H. Besly Co., Chicago.

R. F. Main has been appointed director of the Charles C. Kawin Co. laboratories at Chicago, Dayton, San Francisco and Toronto, Ont., as well as of the new laboratory to be opened at Buffalo in the near future. After graduating from the Ohio State university, he conducted laboratory work for the Illinois Steel Co., Chicago, and the Upson Nut Co., Cleveland, taking charge of the Dayton laboratory of the Charles C. Kawin Co., in 1914. His successor at Dayton is A. M. Knight, formerly chief chemist for the John Deere Co., Moline, Ill.

D. J. Murphy has been made manager of sales for the West Leechburg Steel Co., Pittsburgh. He will have charge of the New York and New England territory with headquarters at 50 Church street, New York. Mr. Murphy was formerly affiliated with the New York sales offices of the American Steel & Wire Co.

Captain William H. Johnson, age 71, Ishpeming, Mich., will retire from active business on Jan. 1. For 41 years he has been affiliated with the Lake Superior Iron Co., the Oliver Iron Mining Co., and other companies now subsidiaries of the Steel corporation.

James F. Duffy, assistant superintendent of the Reed-Prentice Co., Worcester, Mass., will resign Dec. 22, to accept the position of assistant production manager of the Curtiss Aeroplane Co., Buffalo. Before his affiliation with the Reed-Prentice Co., Mr. Duffy was fuel engineer at the South works of the American Steel & Wire Co., Worcester.

Charles Pack, chief chemist and metallurgist of the Doehler Die Casting Co., Brooklyn, N. Y., presented a paper, illustrated with models and lantern slides, on "The Manufacture and Use of Die Castings", before the bimonthly meeting of the mechanical section of the Engineers' Society of Western Pennsylvania, in the auditorium of the Union Arcade building, Pittsburgh, Tuesday, Dec. 4.

Benj. L. Newman has taken over the Cleveland office of the Ohio Iron & Metal Co., Chicago, scrap dealers, and will operate as district manager at 610 Citizens building. He was formerly associated with H. G. Stalnaker when the latter was district manager of the Ohio Iron & Metal Co. Mr. Stalnaker is now vice president of the Stalnaker Steel Co., Pittsburgh, and conducts its Cleveland office at 1112 Citizens bank building.

Zere Browne, who on Nov. 20 became general manager of the Allegheny Steel Co., Brackenridge, Pa., was engaged in research work in its metallurgical department for the Dominion Iron & Steel Co., Ltd., Sidney, Nova Scotia, Canada, prior to 1909, when he accepted a position of a similar character with the Allegheny company. In 1913, he was made assistant to the late W. Lester Walker, then general manager, whom Mr. Browne succeeded.

Spirit of War Rules Convention

Mechanical Engineers at Annual Convention Discuss War Problems Which Technical Experts Must Solve—Attention Directed to Fuel and Labor Conservation and to Airplane Improvements

BEHIND the troops at the battle-front are enormous national organizations of the fighting countries. But behind these super-organizations are the scientists, whose thought and skill are constantly changing the details of modern warfare. In the first place, Germany by the perversion of her science, evolved the present awfulness of war. Then, in self-defense, the science of the allied countries was called upon to combat these agents of Kultur. And now America is just beginning to mobilize her scientists also, that this may be the last great war. In the light of this mobilization, the thirty-eighth annual meeting of the American Society of Mechanical Engineers in the Engineering Societies building, New York, last week, assumed extraordinary interest. Of the members of the society, 433 are already in the enlisted service, which does not include nearly 2000 who are serving the government in advisory and other capacities as "dollar-a-year" men.

Every Engineer Needed

Interest in the meetings centered about the various problems of the war, somewhat less interest than usual being accorded the valuable contributions along strictly technical lines which ordinarily attract so much attention. Many men in uniform, some of them members who have joined the reserve, others army officers who came to learn, attended the sessions. Speakers stated that while every engineer has not yet been called to duty, the time was not far hence when the services of all would be required. The country is rapidly summoning from workshop and laboratory these men whose research and study have been along the lines of advancing human welfare, who are now needed to advance national and world interests through the arts of war.

Notable engineers, who have been called upon to assist the government in its war program, along the lines of transportation, airplane building, fuel distribution, cantonment construction and the like, addressed the convention, describing along general lines those things which had already been done, and pointing out problems yet to be solved. These problems were given to the assembled engineers, not merely for consideration, but for solution, and undoubtedly the convention will show fruitful results in coming months.

Airplane Spark Plugs

For example, Professor W. F. Durand, Leland Stanford university, chairman of the national advisory committee on aeronautics, in discussing the problems of airplane development, said that spark plugs in their present form had been developed for the automobile industry and that their life in airplane work was very short. He suggested that work might well be expended in developing a spark plug for airplanes. Mr. Durand said that the signal corps of the war department would soon exceed in numerical strength the entire standing army of the United States prior to our entrance into the war. He said that in a short time there would be 50 acres of new airplane capacity in addition to that which was operating two months ago.

He warned against too much stress on standardization, except of types and for definite periods,, as changes and improvements in this field are coming so rapidly. He likewise advocated doing away with the present system of trained pilots and observors unskilled in flying, stating that every observor should be able to handle a machine. While not naming any figures as to the number of planes now building in the country, Mr. Durand said that he recently visited a plant in Detroit where the work of making cylinder forgings for all airplane engine manufacturers is concentrated. He said that the present output of this plant is 1200 forgings a day, and that the amount will soon be substantially increased. Speaking of the Liberty motor, he refuted the rumors that have been circulating as to the lack of success of this engine, stating that although some minor defects had appeared, such as were to be expected, these had not been fundamental, but had been overcome, and that the motor is now being manufactured on a large scale.

Spirit of the Convention

Ira N. Hollis, retiring president of the society, expressed the purpose of the convention most accurately when he said:

"Unless some conscience is aroused that science is not to be used against man, but for him, then it will never be safe for this world. It is our task as engineers to assist in making the world safe against the forces we have unloosened, so that the century may not close with a total failure of the civilization of the Christian races. It is we who have developed the application of science, and it is we who are using it to destroy one another, forced into the struggle by the rulers of a nation that knows no right except might and no mercy except that which is taught them by the sword."

Engineers Are Helping

Gano Dunn, chairman of the engineering committee of the council of national defense, told how the 30,000 engineers represented in the great technical societies of this country are quietly serving the government in performing all manner of duties, confidential and otherwise. He related how at the outset of the war the government soon used up its own resources of professional men and fell back upon those of the societies, which responded patriotically to their new duties and opportunities. He said that members stood ready to answer the call even as numbers have already responded, by severing all their business connections and sacrificing their incomes.

Dr. Charles S. Howe, president of Case School of Applied Science, Cleveland, discussing "Special Education in Time of War", mentioned the effects of the draft in draining the technical schools of all their physically fit men before they attained their degrees and received the full education which would enable them to give best service to the government. He did not advocate relieving technical students from the draft, but urged that some means be adopted whereby they might continue in the service, subject to the orders of the war department, and at the same time continue their studies. Failing this, he suggested that the first two years in college, when men were below draft

age, they be allowed to concentrate on technical matters dealing particularly on the war.

The statement that one out of every three freight cars in use in this country carries coal was made by Prof. L. P. Breckenridge, of Yale university, who discussed the "Fuel Problem". He said that all coal mined is being transported and used to fill our enormous requirements, and the vital question in the fuel problem is to cut down on the requirements so that more freight space can be used to carry other commodities. He suggested rationing all communities, industries and plants. Professor Breckenridge said that little fuel was being wasted in this country. Seventy per cent of all the coal burned is used for raising steam and that is in the charge of engineers. He said that at every convention he had ever attended, conservation of coal had always been preached. "It was certain," he continued, "that none of this 70 per cent was being wasted."

Waste of Coal

A contrary view was voiced at another session, when David M. Myers, consulting engineer, New York, read a paper on the "Preventable Waste of Coal". Mr. Myers asserted that hundreds of large plants are consuming coal wastefully, in many cases more wastefully and carelessly than ever before, thus causing directly and indirectly a large fraction of the existing car shortage. "Seven hundred million tons of coal will be mined in the United States in 1918, of which two-thirds will be used for steam making purposes on land," Mr. Myers said. "By employing proper operating methods in boiler plants it is possible to save in excess of 10 per cent of this coal, or say 50,000,000 tons, which would release cars for other important service, equivalent to the entire coal-carrying capacity of the Pennsylvania lines east of Pittsburgh. Moreover, at $5 a ton, there would be a direct money saving to the industries of a quarter of a billion dollars. If we extend our field to include a consideration of the economy with which steam itself is utilized and applied, the above-predicted saving could, without a doubt be doubled. There is a widespread ignorance in regard to the value of exhaust steam in hoisting and in process work, and the coal consuming public should be taught that a heating system which requires 100 boiler horsepower may have a steam engine inserted between boiler and heating main and obtain nearly 100 mechanical horsepower in addition to the required heating for about the same consumption of fuel."

Admiral F. T. Bowles was on the program for a talk on "Building a Merchant Marine", but pressing duties at Washington detained him. William P. Kennedy, consulting engineer, New York, took up the question of "Motor Transportation" and discussed means of relieving railroad congestion by the extensive use of motor trucks. This talk was aptly followed by a discussion of army transportation by Major L. B. Moody, of the carriage division of the ordnance department, who illustrated his talk with slides on a screen. He stated that this division, serving the communications between the railroads at the rear and the mules at the front, consisted of one officer and a few assistants when we entered the war, but has now grown to 40 times that size and has spent more money than the entire cost of the Panama canal.

A Duty of the Engineer

"For humanity's sake, for our own sake, we engineers, as a profession, must go into this crippled soldier work. There has been much talk of the human element, and of the engineers' neglect of consideration of it. The engineer is doing his bit in the war work with material things. The crippled soldier work is the human element side. Let us take the three phases—the engineer, the cripple, and the new education,—and by our activity in the crippled soldier work relate these three so closely with one another that through the engineer's participation in the new education the cripple may be transformed from a 'discard' to a 'champion,' who has won success in spite of a handicap; and who has used his variation from normal to foster the national movement toward better methods of education."—Frank B. Gilbreth.

The Cripple in Industry

Some interesting sidelights upon the construction of military camps and cantonments were cast by Leonard Metcalf, Metcalf & Eddy, Boston, in a paper, "The Solution of the Cantonment Construction Problem."

Another subject which attracted much interest at the convention concerned the work of women in the war and the utilization of crippled soldiers. Maj. Frank B. Gilbreth, of the engineers' reserve corps, who has devoted many years to the application of efficiency principles in industrial plants, spoke on the subject of "The Engineer, the Cripple and the New Education." Major Gilbreth has been very successful in improving upon nature in the designing of contrivances for human beings which are creating a new era in efficiency. He has supplemented artificial limbs by what he calls "supplementary" limbs, which can be put at the disposal of the maimed worker. Major Gilbreth showed photographs of these marvellous limbs.

He advised the displacement of able-bodied men at simple tasks with crippled men, when the latter come back from France and said that this was a field in which every person could use his influence. He concluded his talk with a plea to the engineers to assist in solving the crippled soldier problem.

John W. Upp of the General Electric Co. took up the discussion of "Women and the War". He said that we in this country know the women of Europe have responded magnificently to the needs of the warring nations, but we have not taken full advantage of this knowledge. But the need has become so great, he said, that women are already beginning to take the place of men and they are in the new fields to stay.

Women in Shops

Chester B. Lord, Wagner Electric Co., St. Louis, declared that it was not necessary that women in munition and other plants wear overalls, although a uniformity of dress is desirable. He said his plant had found by experience that the best clothes for women workers were a dark skirt, an unfadeable blue linen waist of standard design, and a uniform apron. He said that all women workers usually would obey such rules provided the rules were enforced for everyone. The uniform clothes were optional on Saturday, as many women desired to shop on the half holiday. Mr. Lord said that in employing women successfully in plants many little things had to be taken care of that would contribute to their contentment of mind, without which they were not efficient. He said that all the machines in the shops of his company are painted white, and special attention has been given to cheerfulness and cleanliness throughout the work rooms and conveniences. He said that in his plant there are an average of two marriages a month, among the employes, and that they are always successful, chiefly because under existing conditions of working together, women depend entirely upon their natural advantages to attract the men.

and clothes consciousness and vanity are eliminated.

Col. W. O. Ovens, in charge of the motion picture department of the American medical museum at Washington, declared that he had come to look upon doctors and medical men as biological engineers, inasmuch as their chief business was to keep the human engine in perfect working order.

At one session Maj. B. C. Detchon, ordnance department, was allowed to interrupt proceedings to make a stirring appeal to the heads of large industrial plants who were present, to release 10 per cent of their mechanics for immediate service behind the lines in France, even if they had to take the time and pay the expense of greenhorns to replace them. He said the need was imperative and the sacrifice must be made immediately. At this meeting also a cablegram was announced from the International Young Men's Christian association in France, calling for 300 building construction experts to sail for France within 10 days to work on the construction of Y. M. C. A. buildings for the men of the American expeditionary forces.

Transfer of Heat

A number of interesting papers were read at the general and special sessions of the convention. Lawford H. Fry, Burnham, Pa., in a paper on "The Transfer of Heat Between a Flowing Gas and a Containing Fluid" presented a logarithmic formula adapted from that proposed by Hedrick and Fessenden, which he claims gives satisfactory results. Mr. Fry asserts that from an early period in the history of physical research the thermodynamic process of the transfer of heat between a flowing gas and the wall of the flue through which it flows has been the subject of the most searching study, but up to the present no general formula has been developed to cover the process.

E. T. Adams, Syracuse, N. Y., in a paper entitled "The Steam Motor in the Automotive Field", points out that the tremendous increase in the demand for automotive power has outdistanced the ability of the gasoline engine to meet this demand, chiefly on account of the condition that the supply of fuel is not now equal to the requirements. He stated that the steam unit has many advantages for automotive service, which he discussed

F. W. Dean, Boston, mill engineer, Boston, in "An Account of the Engineering Work of E. D. Leavitt", covers the life and engineering achievements of the late Erasmus Darwin Leavitt, one of the original members of the American Society of Mechanical Engineers, and past president and vice president of that organization.

Prof. C. C. Thomas John Hopkins University, Baltimore, in a paper entitled "The Cooling of Water for Power Plant Purposes", presented the results of an extended experimental investigation with spray ponds. This investigation involved the determination of the efficiency of the cooling process under the varying conditions of pressure at the spray nozzles, the temperature of the water to be cooled, the power required to circulate the water, the height of sprays above the pond surface, the effect of wind velocity on the cooling range, etc.

Labor Turnover

Richard B. Gregg, 814 Flatiron building, New York, urged manufacturers to give deep consideration to an increasingly important phase of the labor problem, namely, the labor turnover, or the shifting of workers from one place of employment to another. In his paper on "Labor Turnover and the Labor Problem", Mr. Gregg considered the various causes that have given rise to the problem and suggests other aspects to the subject that still remain to be explored, leaving a discussion of the remedies which have proved successful for future treatment.

Prof. A. H. Anderson, Armour University, Chicago, in a paper on "Plotting Blower-Test Curves" added another method to the several now in use. Diagrams were presented for impellers with blades tilted forward, blades radial, and with the blades tilted backward, the co-ordinates used being revolutions per minute and static pressure in inches of water. Two series of curves are given, one showing various rates of discharge in cubic feet per second, and the other the volumes discharged per second per horsepower.

Submarine Development

C. H. Bedell, Groton, Conn., electrical engineer for the Electric Boat Co., in his paper entitled "The Submarine", discussed the various stages in the development of the submarine, from the early hand-propelled type to the modern type, now employed in the service of the United States navy. He covered in detail the construction, equipment and operation of the modern submarine, touched also upon such topics as the periscope, diesel submarine engines, diving, balancing, the rescue of men from a sunken submarine, etc.

N. W. Akimoff, of the Dynamic Balancing Machine Co., Philadelphia, in his paper on "Recent Developments in Balancing Apparatus", discussed improvements which have been made upon the balancing machine described by him in a paper presented before the American Society of Mechanical Engineers in 1916. He also presented a complete revision of the usual method for securing static balance in a body used as a step in the process of determining its dynamic balance. Two formulas were given to estimate numerically the lack of precision in ordinary methods for obtaining such static balance.

H. L. Gantt, industrial engineer of New York, in his paper on "Expenses and Costs", stated that there are in every manufacturing enterprise expenses which do not contribute either directly or indirectly to the production of material. He asserted that such expenses should not be considered as a part of the ligitimate cost of the material, but should be kept in a separate account. He further claimed that expenses in this account should be classified according to their various causes, and that strenuous efforts should be made to eliminate these causes and thereby reduce this nonproductive expense.

W. J. A. London, of the General Electric Co., Springfield, Mass., presented a paper entitled "A Commercial Analysis of the Small-Turbine Situation", which was devoted to a commercial analysis of four types of small steam turbines now on the market and used for driving auxiliary machinery, dealing principally with noncondensing units. In these, it was stated, theoretical design presents no difficulties, but the mechanical design is what determines success or failure. Some of the problems involved and the methods employed in solving them were indicated.

C. J. Rambsburg, second vice president, and F. W. Sperr Jr., chief chemist of the H. Koppers Co., Pittsburgh, in their paper on "By-Product Coke and Coking Operations", discussed the notable events in the history of by-product coke-making in the United States since the introduction of the process in 1906, and then gave a brief account of the generally accepted theory upon which the latter was based. They also took up the subjects of shape and structure, and presented a standard method, which they devised for grading coke according to its cell structure. The combustion of coke in the blast furnace was considered with reference to the size and grade of the fuel. The paper concluded with a description of methods employed in eliminating sponge and in overcoming too great density in cell structure.

The discussion of the inspection of munitions claimed a large share of interest. So much difference of opinion had existed between American manufacturers and the agents of allied governments when the foreign war orders began to pour into this country, that it was felt necessary to take steps to prevent a recurrence of these differences between manufacturers and our own government at the present time. Accordingly, at the machine shop session, A. L. DeLeeuw, of the Singer Mfg. Co., Elizabethport, N. J., read a paper on the "Logic of Inspection", in which he bared some of the problems of this phase of distribution, pointing out that good sense must be exercised in laying out specifications for the inspector to follow. Following Mr. DeLeeuw, F. A. Waldron, industrial engineer, New York, talked on the "Relation of Inspection to Product". He urged that specifications be drawn with as high tolerance as possible, that there be no more wastage than necessary, pointing out that this caution would be in itself a war measure, because of the high cost of tool and high-speed steels. The attitude of the government was voiced in a paper read for Col. B. W. Dunn, of the inspection department of the gun division of the ordnance department, who discussed the "Principles of Government Inspection of Munitions". Colonel Dunn himself was unable to attend, owing to illness, but a subordinate read his address. He pointed out that absolute accuracy was essential, because of the frequent use of barrage fire in present-day warfare, when troops followed a few feet behind the wall of shell fire. Much deviation from precision would result in our own soldiers being caught in the gunfire of their supports. Sir Charles Ross, of the Ross Rifle Works, Canada, described the experience of his company in working on war contracts and suggested that this country solve the difficulty of inspection by naming an impartial board to investigate thoroughly complaints made either by manufacturers or inspectors. This suggestion was received by the engineers with considerable favor.

Advisory Service

To Be Rendered Government by Boards from Various Industries

Pursuant to recommendations made at the war convention of the Chamber of Commerce of the United States of America, held at Atlantic City, Sept. 18 to 21, a large number of industries have appointed war service boards and a meeting of the chairmen of these committees was held at the New Willard hotel, Washington, Wednesday, Dec. 12. These committees are representative of their respective industries and will endeavor to render immediately available, valuable sources of information upon which the government may draw in connection with the countless business and industrial problems attendant upon the conduct of the war.

The different committees appointed by the council of national defense and by the advisory commission, have tendered their resignations in order to prevent a continuance of the embarrassing situation wherein members of the committees were called upon to act both as government agents or advisors and at the same time as representatives of their respective industries. In a large measure these war service boards will be able to render practically the same service and can extend to the council of national defense the same measure of co-operation as the former advisory committees.

Builds New Ship Plant in Record Time

In 26 working days, the Groton Iron Works, Groton, Conn., has built on the site of what formerly was a shore resort show place an immense fabricating and assembly shop, 350 by 150 feet, four stories. For speed in construction this is believed to have broken all records of the state for a building of this size. Today the structure is complete with windows and roof in place and is ready for the extensive operations. Five great concrete craneways will lead down from the building and other smaller shops will be added, providing capacity for the building of six large ships at one time. Each keel will rest on a concrete base constructed alongside and parallel to the craneways. One of the craneways is almost completed. The fabricating shop will be commanded by three traveling cranes.

The United Smelting & Aluminum Co., Inc., New Haven, Conn., recently announced a patented process for electro-plating aluminum. Aluminum may be plated with nickel, silver and copper. The process is equally applicable to pure aluminum in sheets, rods, wire, tubing, etc., and to aluminum alloyed with other metals, as in molded or die castings.

Exports Cut Down

Great Britain More Self-Sufficient on On Iron and Steel Needs

Exports of iron, steel, machinery, by Great Britain for the first nine months of 1917, compared with the same period last year, show a decided falling off. This is doubtless caused by steadily increasing war-work requirements. At the beginning of the war England's munitions supplies came from three or four privately owned institutions whereas at the present time, guns, ammunition, etc., are produced in over 4000 government owned establishments, so that the war has brought numerous avenues for the disposal of raw materials which otherwise would be used in material for export. Exports for the nine months, in tons, are as follows:

Table I

	1917	1916
Iron and steel (excluding ore and including scrap)	1,897,634	2,733,548
Machinery, prime movers (excluding electrical) ..	40,528	49,089
Machinery, not prime movers or electrical.....	159,842	179,524
Machinery, electrical	10,660	13,142
Cutlery	1,059	1,278
Hardware	11,302	17,917

Notwithstanding the fact that each of the industries represented has had its ordinary activities seriously interfered with for many months, all are running full time and it is reported that the machine-tool factories are working overtime. All have orders on hand which will require many months to fill. A strict allocation of all classes of machine tools is maintained and makers as well as dealers are bound not to sell except on production of an express authority.

Imports of iron, steel, rails, metals, etc., into the United Kingdom also show a noticeable decline for the first nine months of the year from the same period in 1916, with the exception of zinc. Importation difficulties prevailing at this time largely have been countered by a more extensive working of native iron ores so that the output of iron and steel is not diminished. Imports for the nine months in tons are as follows:

Table II

	1917	1916
Pig iron	93,765	118,984
Iron and steel (excluding ore and scrap).....	359,841	610,803
Rails	219	3,956
Copper	116,727	118,417
Lead	105,800	118,975
Crude zinc	46,147	36,516
Manufactured zinc	3,605	2,836
Tin	20,518	26,596

The Alabama Drydocks Co., Mobile, has completed four sets of ways, and is laying keels on them.

War Readjustment

In Motor Car Industry at Detroit Now Well Advanced

Detroit, Dec. 9.—Complete readjustment of a majority of the large motor car factories in Detroit to war business is expected to be attained by Jan. 1. The Ford Motor Co. rapidly is converting its equipment to handle a vast volume of government orders other than motor cars. Similar readjustments are being hastened by the Maxwell, Studebaker, Paige, Cadillac and other motor plants, including a large number of accessory manufacturing companies.

Manufacturers have petitioned the government to erect here large storage plants for war materials to facilitate capacity loading of freight cars. James Inglis, of the American Blower Co., is handling this project in behalf of Detroit manufacturers.

The supply of labor is abundant in the city but this does not include skilled mechanics, of which there is a scarcity. The railroads are handling incoming shipments of raw materials and fuel in better order than for several years past, but the fuel scarcity is causing much uncertainty in manufacturing lines. Relief has been promised as the city has been given government authority to commandeer 5000 cars of coal now tied up by embargoes on the Chesapeake & Ohio railroad at Cincinnati. The situation was such that the Detroit Edison Co. was menaced by a shut-down before Christmas. This would have suspended operations in many plants engaged in war business.

Construction records are being broken in the completion of the first units of the new Lincoln Motor Co. plant. This project, backed by Henry M. and Wilfred C. Leland, former heads of the Cadillac Motor Car Co., is said to be the largest devoted to the manufacture of Liberty aircraft engines in the country. The first unit of the plant which will cover 50 acres now is completed to the fourth and last story and will be under roof by Jan. 1. A force of 2000 workmen is engaged in the erection work. Machinery equipment now is being ordered in Cleveland and other centers.

The Ford Motor Co., has obtained an order for 5000 complete Liberty aircraft motors. The company now is manufacturing aircraft engine cylinders on a large scale. It is understood that ship fittings also will be manufactured.

Bowen Products Corp. has been incorporated in New York with capital of $2,500,000 to manufacture oiling devices, bolts, etc. It combines the Winkley Co., Canadian Winkley Co., Ltd.; Bowen Mfg. Co., Auburn, N. Y.; Zerk Manufactory Co., Cleveland, and Stahl Mfg. Co., Minneapolis. General offices, scales and purchasing departments will be in Detroit. George W. Bowen is president; George W. Severson, vice president, and Carl I. Overton, treasurer and assistant general manager.

W. R. and H. H. Timken, of the Timken-Detroit Axle Co., are large stockholders in the new Holmes Automobile Co., of Canton, O., which is turning out an air-cooled car. C. H. Rockwell is head of the company.

Substantial Gain

Shown by Canadian Iron and Steel Output During Present Year

Toronto, Canada, Dec. 10.—The mines branch of the Canadian department of mines has received complete returns of the production of pig iron in Canada and with the exception of two small plants full returns of the production of steel ingots and direct steel castings during the first nine months of 1917. The output of pig iron during the nine-month period was 895,307 tons, against 844,717 tons during the corresponding period of 1916. The average monthly production was 99,478 tons, against 97,438 tons the average throughout 1916. Furnaces were in operation at Sydney and North Sydney, N. S., Hamilton, Port Colborne, Sault Ste. Marie and Deseronto, Ont., in addition to electric furnaces producing small quantities of pig iron from scrap steel at Orillia, Collingwood, St. Catharines and Toronto, Ont., and at Montreal. The quantity of pig iron thus produced was 9983 tons. The production of steel ingots and direct steel castings was 1,265,182 tons against 911,054 tons during the first nine months of 1916. The average monthly production was 140,576 tons, as against an average monthly production throughout 1916 of 106,268 tons. Included in this total are 30,960 tons produced in electric furnaces, as against a total of 19,639 tons in 1916. During the month of September the output of steel in electric furnaces was over 5000 tons.

The International Time Recording Co. and the Computing Scale Co., both of Toronto, and the Canadian Tabulating Machine Co. of Montreal, have effected a merger under the title of the International Business Machine Co. The new company is capitalized at $2,000,000, of which $750,000 will be preferred stock. Toronto will be the headquarters and the operations of the Canadian Tabulating Machine Co. will be transferred to this city from Montreal. Thomas J. Watson will be president, F. E. Mutton, vice president and general manager, and J. S. Ogsbury, secretary. L. A. Davidson has been appointed sales manager for the scales department and Sir George Bond of Montreal will have charge of the tabulating machine section.

Obituaries

Ralph E. Ingersoll, vice president and general manager of the Reo Motor Car Co., New York City, died recently, aged 42 years.

Rev. R. Z. Replogle, father of J. Leonard Replogle, steel director for the government, died recently at Johnstown, Pa., aged 77.

William F. Lay, Boston, retired mining engineer and inventor of several mechanical devices, died recently in Bridgeport, Conn., aged 58 years.

F. J. Leacey, superintendent of the plant of the Northern Malleable Iron Co., St. Paul, died at his home in that city, Wednesday, Dec. 5.

Harry V. Pinney, vice president and superintendent of the Remington Arms-Union Metallic Cartridge Co., Bridgeport, Conn., since early in 1915, has resigned to retire to private life.

Robert Macy Callaway, formerly president of the Atlantic Dock Iron Works Co., New York, died recently. He was also president of the Merchants National bank, New York.

Richard Henning, founder and president of the Cream City Boiler Works, Milwaukee, died at his home in that city after a short illness. He was 55 years old and a native of Milwaukee.

Charles E. Lewis, aged 51, died at the Braddock general hospital, Braddock, Pa., Dec. 3. He was born at Wyandotte, Mich., Nov. 26, 1866, and entered the machine shops of the Edgar Thomson works, of which his uncle, the late Capt. William R.

Jones, was general manager, remaining there until 1889 when he accepted a position in the armor plate plant of the Homestead works of the Carnegie Steel Co., of which he was made foreman about 12 years ago.

Halsey Ray Hammond, mechanical engineer for the Western Electric Co., died in the Long Island College hospital, New York, Nov. 28, following an operaton for appendicitis. He was graduated from the Pennsylvania State college last spring.

Axel A. Strom, vice president of the Pettibone-Mulliken Co., and president of the United States Ball Bearing Co., died Nov. 29, in New York City, where he had gone on business. He was born in Sweden in 1855 and came to this country and located in Chicago in 1869.

Charles Dexter Parker, manager and mechanical engineer, the A. Burlingame Co., Worcester, Mass., engineer, machinist and builder of steam power plants, died at the Worcester city hospital Dec. 7, aged 57 years. He was a member of the American Society of Mechanical Engineers.

Job T. Pugh, head of the augur plant in Philadelphia which bears his name, died at his home in Swarthmore, Pa., Nov. 25, following a month's illness. Mr. Pugh's plant is one of the oldest tool-making establishments in the world, having been established by an ancestor in 1774.

Duncan A. Mackenzie, treasurer of the Duncan A. Mackenzie's Sons Co., Trenton, N. J., iron founders, died suddenly Dec. 2 on his way to church, of heart trouble. His family and two brothers, Joseph and Thomas, associated in the iron business, survive. Mr. Mackenzie was a member of several prominent clubs and gave liberally to charity.

Timothy W. Sprague, consulting engineer, Boston, died Dec. 7 after an operation for appendicitis. He was 51 years of age and was a graduate from the Massachusetts Institute of Technology. Since 1887 he has been engaged in electrical engineering and at one time was identified with the General Electric Co., and the Westinghouse-Church-Kerr Co.

Emory H. Diehl, aged 33, died Nov. 20, after a short illness at his home in Canton, O. In 1906 he was graduated from the Pennsylvania State College, and accepted a position with the Carnegie Steel Co. Four years ago he severed his connection with the Carnegie company and became affiliated with the United Alloy Steel Corp., Canton, O., occupying at the time of his death the position of assistant general manager.

Export Control

Over Iron and Steel Products Vested in New Railroad Committee

Seven railroad officials, representing Atlantic ports from Boston, Mass., to Norfolk, Va., have been designated as the export division of the general operating committee, and have control over the entire export traffic of eastern roads in the unmanufactured forms of iron and steel, including billets, bars, plates, scrap and pig iron except for the United States government. The chairman of this committee is George D. Ogden, freight traffic manager of the Pennsylvania railroad. The other members and the parts they represent follow: R. Van Ummersen, general freight agent, Boston & Albany railroad, Boston; F. LaBau, traffic manager, New York Central railroad, New York; Robert L. Russell, general freight agent, Philadelphia & Reading railway, Philadelphia; A. Fries, freight traffic manager, Baltimore & Ohio railroad, Baltimore; E. D. Hotchkiss, freight traffic manager, Chesapeake & Ohio railway, Newport News, and J. R. Ruffin, freight traffic manager, Norfolk & Western railway, Norfolk. The committee's permanent headquarters will be at 165 Broadway, New York. In order that the members of this committee may render continuous service as long as it is required, the various railroads have relieved them from their ordinary duties.

The committee, while exercising control of overseas traffic, will cooperate fully with the agents of the allied powers and the United States government in the effort to secure the best practical results in rail transportation of export freight from the interior to the seaboard. Attention first will be given to administering the general embargo which the general operating committee at Pittsburgh recently ordered the eastern railroads to place on iron and steel billets, bars, plates, scrap and pig iron, except for the United States government. It is expected that this jurisdiction will be extended over other forms of export traffic as the need arises.

Gives Life to France

Business associates and friends in the iron and steel industry of A. A. Fowler, resident partner of Rogers, Brown & Co., New York, are consoling with him on the death of his youngest brother, Eric Anderson Fowler, while serving in the aviation corps of the French army. The young aviator was killed in a flying accident, Nov. 26 at the French aviation camp at Pau. He was 22 years old and enlisted in the French ambulance service in 1916, when still a student at Princeton. Later he took up aviation work. Three other brothers of Mr. Fowler are in the military service of this country and two sisters are acting as trained nurses to the French army.

More Buying

Shown in Benzol for Picric Acid—Phenol Remains Scarce

New York, Dec. 8.—Buying of benzol this week has been more active than for some time past. Most of the current demand is from domestic interests who are manufacturing this product into carbolic acid for use in making picric acid for the government. Unfilled inquiry which now is before the trade, is fairly large. Pure benzol may be quoted at 44 and 46 cents per gallon at producer's plant, both for spot and contract shipment.

Phenol continues strong and is hard to get. The principal producers are sold up in nearly all cases through the first quarter of next year and supplies for earlier deliveries are comprised of scattered lots.

A much improved tone is reflected in solvent naphtha due to new uses which are being developed for this product. Several exceedingly large sales are under consideration and these are expected to go through within the next few days.

Business in sulphate of ammonia this week was comprised, as usual during the past few months, of a few spot carloads which went at around $4.90 to $5 per 100 pounds at seaboard.

Coke Oven By-Products

Spot

Per Gallon at Producers Plant	
Pure benzol	$0.44 to .46
Toluol (nominal)	1.70 to 1.80
Solvent naphtha	.19 to .22
Per Pound at Producers Plant.	
Phenol	$0.52 to .53
Per 100 Pounds at Seaboard	
Sulphate of ammonia	$4.90 to 5.00

Contract

Per Gallon at Producers Plant	
Pure benzol	$0.44 to .46
Toluol	nominal
Solvent naphtha	.19 to .22
Per Pound at Producers Plant	
Phenol (nominal)	$0.52
Per 100 Pounds at Seaboard	
Sulphate of ammonia	nominal

Iron and Steel Financial News

Up-to-the-Minute Fact and Comment Collected and Sifted For Busy Readers

War Tax Stimulates Bond Redemption

OWING to the provisions of the excess profits tax law in its present form, some iron and steel companies are reported to be undertaking a form of financial re-organization, not with a view to evading their taxes unfairly, but as a legitimate and advisable business measure. These companies are redeeming part of their bonded indebtedness from their surplus funds and undivided profits, proposing to issue new stock to cover the additional investment. This new stock may be held in treasury or distributed as a stock dividend.

The reason for this movement is obvious. The scheme of the excess profits section of the war revenue act of 1917 is that a certain percentage of income on invested capital is to be exempt from taxation. It follows that the larger the invested capital is, the smaller the taxes become. The act defines invested capital in substance as follows:

(1) Actual cash paid in.

(2) Actual cash value of tangible property in other than cash for stock or shares.

(3) Earned surplus or undivided profits used or employed in the business, exclusive of undivided profits earned during the taxable year.

Borrowed Capital is Exempt

The act specifically states that invested capital does not include money or property borrowed. Thus, the A Foundry Co. may have a plant valued at $100,000 and working capital of $50,000; in other words, it has $150,000 employed in the business. But of this amount $100,000 consists of funds paid in for stock in the company, while $50,000 was raised from an issue of bonds. On this basis the company must figure its invested capital as $100,000. Now, suppose the company has income of $50,000 in 1917, of which it distributed $35,000 and added $15,000 to surplus, bringing this fund up to $50,000, including $35,000 of undivided profits saved over from 1916 and previous years. The object of this fund is that it may be needed at some future rainy day. This surplus does not figure as invested capital. Furthermore, when the company comes to pay its taxes next June, it will have to pay 10 per cent of this fund to the government, the act providing that a tax of 10 per cent shall be imposed upon the amount of net income remaining undistributed six months after the end of each calendar or fiscal year, which is not employed in the business.

It follows that the sensible procedure for the company to follow is to redeem its bonds. Therefore the management of the A Foundry Co. withdraws its $50,000 from surplus and redeems the outstanding $50,000 bonds. By this action it is investing $50,000 in the business, so it must issue $50.000 to cover new investment. This new stock represents accruing value to stockholders as the result of earnings being invested instead of distributed, so the stock may be distributed in the form of a stock dividend, or perhaps held in the treasury for later sale or distribution. The company thus has killed two birds with one stone. It has increased its invested capital and it has eliminated the surplus account which was subject to the 10 per cent tax. Its income will amount to 33 1/3 per cent of its invested capital instead of 50 per cent. Its excess profits tax, presuming that it is entitled to a 9 per cent exemption, would amount to $7200, whereas prior to the redemption of the bonds they would have amounted to $17,400. Including the 10 per cent tax on surplus, which would have been $5000, the company would save $15,200.

Much Redemption Likely

It remains for the treasury deartment to interpret the excess profits section of the war revenue act. But if these forthcoming rulings place the same construction upon the wording of the act as accepted by the financial advisors of some of the iron and steel companies, there probably will be a general movement to redeem bonded indebtedness from surplus. This procedure is perfectly justifiable, for in the last analysis it is merely the payment of a debt, to which surely no odium can be attached.

Lackawanna Protests Tax

A tax protest has been filed by the Lackawanna Steel Co. against what it terms is excessive valuation of its property. Because of supposed increase in the value of steel property, appraisers have added an increased assessed valuation of $37,482,465 on the city of Lackawanna, the home of the plant, and it is claimed that if the increased taxes are allowed by the tax equalization committee, a hardship will result, as the company is endeavoring to establish a reserve of $14,000,000 to meet the government tax. The Lackawanna company's legal representatives value the plant property at $3000 an acre instead of $4000 and the entire land, buildings, cars, tracks, machinery, etc., at $80,101,126, a difference of almost $30,000,000. The monthly payroll in Buffalo amounts to $800,000 and against this a state income tax of $259,000 was assessed.

Gary Denies Stock Rumor

A rumor that the finance committee of the United States Steel Corp., was considering the issuance of a stock dividend on the common shares which would amount to 66 2/3 per cent was denied recently by Chairman E. H. Gary. It was reported that surplus and earnings to the amount of $330,000,000 would be invested in Liberty loan bonds and foreign government notes and bonds and the dividend issued to the present shareholders.

Texas Sells Furnace and Quits Iron Business

The Texas state prison commission has sold the iron industry which was operated for many years as a part of the penitentiary system at Rusk to L. P. Featherstone, of Beaumont, and associates, for $112,500. Mr.

Featherstone is president of the Texas Steel Co., which plans to build an open-hearth steel plant at Beaumont. The property represented in the transaction consists of a blast furnace, pipe foundry, electric light plant and railroad terminal tracks at Rusk, and 136 acres of iron ore land. The price of $112,500 which Mr. Featherstone and associates paid does not include the unmined ore. For this ore the sum of 50 cents per ton for 50 per cent metallic iron is to be paid the state. It is stated that the blast furnace and pipe factory at Rusk which have been closed for some time will be repaired, enlarged and again placed in operation. Immediate steps will also be taken to reopen the ore mines.

This iron industry has been a burden on the state for several years. At brief intervals it was operated at a profit but in all it has cost the state several hundred thousand dollars. The legislature, at its recent regular session authorized the state prison commission to dispose of the property.

Steel Subsidiaries Make Capital Increases

Two subsidiaries of the United States Steel Corp. have filed papers with the secretary of state at Springfield, Ill., to provide for an increase of their capital stock. The Indiana Steel Co., Gary, Ind., has increased its shares from a total of $20,000,000 to $50,000,000, and the Universal Portland Cement Co., Gary, Ind., from $1,000,000 to $3,500,000. No official explanation has been given as to the reasons for these increases.

Ford Appeals Decree

An appeal to the Michigan state supreme court to the decision of the Wayne county circuit court, at Detroit, requiring the Ford Motor Co. to disburse $19,275,385 or one-half of the accumulated cash surplus, to stockholders, has been filed by Henry Ford. The circuit court, in a final decree, issued Dec. 5, in the suit of John F. and Horace Dodge, stockholders, held that the company must make the distribution in 30 days. The appeal suspends compliance with this order until after a hearing next March or April. The decree condemns the practice of withholding dividends from the stockholders beyond the fixed assets necessary to operate the company. It does not mean that the Ford blast furnace plans will be interfered with. It was to prevent the use of the company's surplus in constructing this plant that Dodge brothers filed their suit.

To Consider Increase

Stockholders of the Liberty Steel Co., Youngstown, will meet Dec. 14 to consider the recommendation of the directors that the common stock be increased from $500,000 to $650,000. Eight large tin mills are being installed in the company's new plant which will be in operation about March 1, and the proceeds of this appropriation if made will be used in that direction. With this increase, the total capital stock would be $900,000, of which $250,000 will be preferred. Warren banks have purchased bonds to the amount of $150,000 to be issued by the Liberty Steel Co., about Jan. 12.

Merchandise Exports Still Gain Over Imports

That each year of the war finds increasing the excess of United States merchandise exports over imports, is graphically shown by the report of the bureau of foreign and domestic commerce recently issued. The figures of this excess for October, 1915, 1916 and 1917, are $186,979,280, $314,155,188 and $320,390,652 respectively. This ratio of increase was uniformly maintained in the 12 months ending Oct. 31, in each of those years, since the totals are $1,626,813,901, $2,793,054,134 and $3,302,572,401, respectively. For the first 10 months of each year, the figures given as the value of exports over imports are $1,416,426,617, $2,433,406,599 and $2,644,973,234 respectively.

Imports for October, 1917, totaled $221,239,405 and exports for that month, $541,630,057, compared with $178,658,730 and $492,813,918, respectively, in October, 1916, $149,172,729 and $336,152,009 in October, 1915. For the 10 months ending Oct. 31, 1917, the total value of imports was $2,504,033,908 and of exports, $5,149,007,142. This compares with $2,009,833,398 and $4,443,239,997 one year ago and of $1,451,267,515 and $2,867,694,132 two years ago.

Financial Crop Ends

The Victor Trailer Mfg. Co. has purchased the plant of the Nebraska Foundry Co., Omaha, Neb., which will be enlarged and improved.

* * *

The Kansas City Malleable Foundry, Kansas City, Kansas, which has been idle since 1916, has been taken over by the Thomas Railway Track Appliance Co., which is manufacturing a patent malleable railroad tie plate. About 50 men are employed.

* * *

The plant and stock of the Union Foundry Co., Anniston, Ala., has been purchased by the Union Pipe Co., Birmingham, Ala. Temporary officers are: W. F. Johnston, president; Thomas E. Kilby, chairman of the board, and Whitfield Clark, secretary.

* * *

A charter amendment filed by the Tennessee Valley Iron & Railroad Co., Pittsburgh, increases its capital from $1,200,000 to $1,500,000. The directors follow: H. B. Duncan, C. N. Brady, R. V. Baker, W. T. Hyniker, Arthur R. May, Charles E. Breitweiler and Thomas S. Bilie.

* * *

The Pittsburgh Knife & Forge Co., northside, Pittsburgh, recently took over the property formerly equipped by the Diamond Forge & Mfg. Co. The knife and forge company has doubled its capacity and installed new equipment, including three hammers and several upsetters.

* * *

The Whitman Agricultural Co., St. Louis, manufacturer of hay tools and mill supplies, shortly will change its firm name to the Whitman-Bull Tractor Co., following a combination with the Bull Tractor Co. of Minneapolis. The equipment of the latter company's plant will be removed to St. Louis and a new foundry will be erected in the spring that will have a capacity of about 15 tons daily.

* * *

Increases in capitalization reported recently include the Bethlehem Steel Co., South Bethlehem, Pa., from $57,500,000 to $65,000,000; the National Steel Products Co., Birmingham, Ala., $33,340 to $83,340; the Kentucky Solvay Coke Co., Ashland, Ky., $2,700,000 to $5,200,000; the Keith Railway Equipment Co., Chicago, $5000 to $1,000,000; the U. S. Auto Lock Co., Chicago, from $2500 to $20,000; the Aurora Metal Co., Aurora, Ill., from $50,000 to $200,000; and Dodge Bros. Motor Corp., Detroit, from $6,000,000 to $10,000,000.

Advances Are Sought

That delay in the government's ordnance program is a possibility unless funds are advanced by the government to the Bethlehem Steel Corp. to cover contracts for munitions and other war work with that producer, was the fact brought out in a conference between Chairman Charles M. Schwab and President Eugene G. Grace with Secretary of War Baker in Washington recently. Mr. Schwab has stated that for the first time in the history of the Bethlehem Steel Corp., it has asked the government to advance the regulation 30 per cent. The Bethlehem corporation now has contracts involving hundreds of millions of dollars and since adequate funds are unobtainable from the banks, he says work cannot be expedited unless congress grants relief.

Government to Buy More Cranes

Bids to be Opened in Washington for 60 Additional Locomotive Cranes for 1918 Navy Yard Requirements—Place $500,000 Lathe Order for Watervliet Arsenal—Many Inquiries Still Pending

GOVERNMENT buying for arsenals in this country and for the ordnance base depot in France has attracted widespread interest in the machinery markets in the past week. Some large orders have been closed and still others are being closed. The Cleveland Machinery & Supply Co., Cleveland, has been awarded an order for over $500,000 worth of Cleveland gun boring lathes and Cleveland geared head heavy duty motor-driven planers for use at the Watervliet arsenal, Watervliet, N. Y., which is enlarging its ordnance-making facilities. This order was placed through the W. F. Davis Machine Tool Co., 35 Liberty street, New York. The Davis company also is understood to have sold about $100,000 worth of miscellaneous machine tools for the ordnance base depot in France. The Stone & Webster Engineering Corp., Boston, has placed an order for 30 overhead traveling cranes with the Chesapeake Iron Co., Baltimore, for the Watertown arsenal, where a gun-mount shop is being built. The Standard Ordnance Corp., 115 Broadway, New York, has been inquiring for about 50 gun boring lathes for the Mosler Safe Co., Hamilton, O. The Bogert & Carlough Co., Paterson, N. J., and the Merchant Shipbuilding Co., Bristol, Pa., have been in the market for punching machinery. Fewer large lists of machine tools have appeared in the market the past week or so, but heavy buying is still being done by various ordnance and munition makers in scattered lots. The requirements of the destroyer builders appear well covered. These needs have been filled with a rapidity, which is remarkable in view of the present condition of the market. It is reported the Squantum plant of the Fore River Shipbuilding Corp. will begin operating by Dec. 15, while work is similarly being speeded up in the plants of the other companies sharing in the navy department's emergency program.

To Open Bids on Sixty Cranes

THE bureau of yards and docks, navy department, Washington, will open bids Dec. 14 on 60 locomotive cranes which are the estimated requirements of the various navy yards for 1918. These cranes are to have carrying capacities as follow: Forty-six, 15 to 20 tons; six, 20 to 30 tons; and eight, 5 tons. Deliveries are requested as soon as possible. It is probable these cranes will be completed by the middle of 1918. The William Cramp & Sons Ship & Engine Building Co., Philadelphia, has closed for four 7½-ton and one 20-ton electric traveling cranes. The Turner Construction Co., New York, is in the market for electric cranes for a building now being erected, the name of the owner being withheld. The Federal Shipbuilding Co., New York, has closed for five locomotive cranes, but has not yet acted on the 20 electric traveling cranes for which it has been inquiring. The Chesapeake Iron Works has been awarded an order for one 20-ton and one 15-ton electric traveling crane for the Tacony Ordnance Corp., Tacony, Pa. The J. G. White Engineering Corp., 23 Exchange Place, New York, is in the market for two overhead cranes. The American Can Co., which recently was inquiring for two cranes, one of which was to have three to ten tons capacity, the other 12 to 20 tons, now is considering buying jib cranes. The plant of the Southern Shipbuilding Co., Charleston, S. C., which, as previously stated, will build 16 7500-ton steel cargo ships will require a number of cranes and other equipment. Whittlesey & Whittlesey, New York, are in charge. The United States Steamship Co., 50 Broad street, New York, has been awarded additional cargo ship contracts valued at $18,000,000, and is preparing to extend its facilities, having bought a 68-acre site at Alexandria, Va., where it will immediately begin to erect a yard. The company also has plants at Groton and Noank, Conn.

November Tool Sales Break Record

GOVERNMENT demands are growing greater week by week and are affecting the machine tool trade to a pronounced degree. The government has commandeered both new and second-hand equipment while in transit and has diverted this from its destination to other places where the need seemed greater. Instances are known even of tools being taken out of shops and shipped to other users whose needs were more urgent. So many priority certificates have been issued that mere possession of such a paper means practically nothing now and machinery builders frequently require a special order from the priority board before shipping equipment. Buying continues at the Rock Island arsenal under a new buying plan. Under the new system representatives of dealers meet with the buyer and orders are placed for one machine after another on informal verbal bids; thus, much time is saved. November tool sales have been the largest in the history of many sellers in Chicago and inspection of the business reveals that the bulk was not from large orders, but rather from small buying. The Rock Island arsenal recently bought about $400,000 worth of equipment for shop G, mostly 24-inch lathes. The Holt Mfg. Co., Peoria, Ill., has placed orders for some equipment, but will buy considerable more. Sears, Roebuck & Co. are planning to build a plant to manufacture stoves and tractors. The Tri-City Steel Co. will build a mill and warehouse at Madison, Ill. The Cousins Tractor Co. will build a tractor manufacturing plant at Hanford, Cal. The American Car & Foundry Co. will build a machine shop at Detroit, for producing artillery. The Locomotive Materials Co., Atchison, Kans., is building a 2-story machine shop. The Liberty Foundry Co., recently incorporated at Milwaukee, is preparing to build a foundry. The Thomas Engineering Works, Portland, Oreg., will build a plant to manufacture riveting machines and other equipment.

New Tax Law Claims Builders' Attention

MACHINE tool builders are wrestling with data preliminary to filing the report required by the new excess profits tax law. The preparation of the first report has come to be generally regarded as

AGATHON
ALLOY STEELS

The plant makes the product, but the product makes the plant.

In other words, the worth of any product can usually be accurately gauged by the plant which produces it.

In less than three years the demand for AGATHON Quality Alloy Steels has resulted in one of the most modern steel plants in the world—that of

The Central Steel Company
Massillon, Ohio

Detroit Office: 326-27-28 Ford Bldg.
F. Walter Guibert, District Representative
Cleveland Office: Hickox Building
The Hamill-Hickox Company, District Representatives
Chicago Office: 1370 People's Gas Bldg.
122 So. Michigan Blvd.
A. Schaeffer, District Sales Manager
Philadelphia Office: 603 Widener Building
Frank Wallace, District Sales Manager
J. E. Dockendorff & Co., 20 Broad Street, New York
General Export Agents

AGATHON STEELS TRADE MARK

"AGATHON" Chrome Nickel
"AGATHON" Chrome Vanadium
"AGATHON" Nickel Steels
"AGATHON" Special Analyses
"AGATHON" Vanadium
"AGATHON" Chrome Steel
"AGATHON" High Carbon

being in the nature of a rebus. Typical of the wide divergence of opinion as to the procedure necessary, the following is a fair example. One builder, wishing to substantiate his theories, recently sent copies of the report he had prepared to several prominent men engaged in other lines of business and invited criticism. The replies were disappointing, as they were at great variance. The dissimilarity was marked in that no two of the replies agreed in their criticisms of the major feature of the report. Deliveries on heavy tools steadily are growing worse; small tools, however, may be obtained within a comparatively reasonable time. Due to the enlargement of the manufacturing facilities of machine tool builders who have been specializing in small tools, these may be obtained within approximately two months. Many newly organized companies now are putting their product on the market and are offering tools for immediate delivery. These, it is thought, may have considerable effect on delivery dates in general. By far the largest inquiry received in the Cleveland market for some time, is that of the Willys Overland Co., Toledo, O., which is in the market for a large number of lathes, boring mills, multiple spindle drills and milling machines. Owing to war contracts which recently have been received by the American Shipbuilding Co., Cleveland, the company recently has entered the market for additional equipment, including two vertical boring mills. C. E. Bell, Hillsboro, O., is in need of a number of single-purpose lathes. The Port Arthur Shipbuilding Co., through its Cleveland purchasing agency, 350 Rockefeller building, continues to buy equipment from time to time. Plant additions are being completed by the Sidney Tool Co., Sidney, O.; the Screw Products Co., Toledo, O., and the Vlchek Tool Co., Cleveland.

New Construction and Equipment

Concise and Timely Business Building Opportunities from the Field of Industry

Along the Middle Atlantic Seaboard

BROOKLYN, N. Y.—The Vogel Stamping Corp. has been chartered with $10,000 capital to manufacture metal products. The incorporators are A. R. Ulrich, E. N. Helff and P. Suau, 24 East Thirteenth street.

BUFFALO.—The J. P. Devine Co., 3172 Clinton street, has awarded the contract for a 1-story addition to its foundry, to cost $5000.

GREENWICH, N. Y.—The plant of the Eddy Plow Co. has been damaged by fire with a loss of $40,000 to buildings and machinery.

NEW YORK.—Blenio, Inc., has been chartered with a capital of $200,000 to manufacture fireproofing and waterproofing paints. The incorporators include T. T. Ansberry, Robert C. Hotson and John W. Dawson, 52 Vanderbilt avenue.

NEW YORK.—The Hercules Electric Steel Corp. has been incorporated by W. L. Scott, W. H. Rich, 110 Liberty street, and others. The company is capitalized at $50,000.

NEW YORK.—The Leslie-Stevens Co. has been chartered to manufacture and deal in electrical and general engineering supplies, with a capital of $10,000. The incorporators are E. A. Leslie, C. H. Stevens, and W. P. Faendler, 618 Eleventh street, Brooklyn, N. Y.

NEW YORK.—The Columbia Metal Hose Works has been chartered with $30,000 capital to manufacture flexible hose and tubing. The incorporators are S. Daniels, J. Rosenfeld and L. Rutstein, 21 East 119th street.

NEW YORK.—The Production Equipment Co. has been incorporated to manufacture boilers, foundry and factory supplies. The company is capitalized at $20,000 and its incorporators include W. W. Gibbons, W. J. Forster and S. M. Morey, 50 Church street.

NEW YORK.—The Federal Resilient Wheel Corp. has been organized to manufacture automobiles and airplanes. The company is capitalized at $500,000 and its incorporators include Z. W. Commerford, J. D. Anglin and J. Feinbloom, 78 West Eighty-second street.

NEW YORK.—The Richvale Furnace Co. has been organized under a Delaware charter by Samuel B. Howard, George V. Reilly and Arthur W. Britton, 80 Broadway. The company is capitalized at $1,000,000.

NEW YORK.—The Richvale Steel Co. has been granted a charter under the laws of Delaware with $1,000,000 capital. The incorporators are George V. Reilly, Samuel B. Howard and Arthur W. Britton, 80 Broadway.

NEW YORK.—The American Pipe Bending Co. of New York, has been chartered with $10,000 capital. The incorporators are G. W. Graham, J. W. Ashton and H. Van Wyck, 1883 Southern boulevard.

ROCHESTER, N. Y. — The Symington Forge Co. has secured a permit to erect a 1-story machine shop on University avenue, to cost $150,000. The building will be 175 x 342 feet in size.

BRIDGEPORT, PA.—The Philadelphia & Reading railroad will construct a 1-story brick and concrete engine and power house.

HARRISBURG, PA.—The Atlantic Refining Co. has purchased the plant of the Pennsylvania Bronze Foundry Co. at Camp and Seventh streets, and will build a 1-story foundry at Camp and Emerald streets.

HARRISBURG, PA. — The Pennsylvania Bronze Foundry Co., Seventh and Camp streets, will build a 1-story foundry, for which bids are being received. W. Dehart is in charge.

LATROBE, PA.—A charter has been granted to the Keystone Automobile & Machine Co., capitalized at $15,000. Benjamin Ratner is interested.

MILLERSVILLE, PA.—The plant of the Lancaster Electric Light, Heat & Power Co. has been damaged by fire with a loss of $90,000.

NEW CASTLE, PA.—The Birdsboro Steel Foundry & Machine Co. will build a plant addition.

NEW CASTLE, PA. — The Solid Drawn Forge Co. will build an addition to its plant.

PHILADELPHIA.—W. B. Chambers will build a 1-story machine shop 32 x 32 feet in size, at Yocum and Seventy-second streets. Contract has been awarded.

PHILADELPHIA. — The Harrison Safety Boiler Works has awarded the contract for an addition to its foundry on Seventeenth street.

PHILADELPHIA.—William Steel & Sons have been awarded the contract for building several additions to the Frankford arsenal. The cost of the improvements is estimated at $97,000.

PHILADELPHIA.—The Forge Chain Block & Mfg. Co., 139 Oxford street, has let the contract for a 3-story plant addition 46 x 94 feet in size.

PHILADELPHIA.—The William Steele & Sons Co. was low bidder on the engine house and machine shop for the Philadelphia & Reading railroad, at the contract price of $323,517.

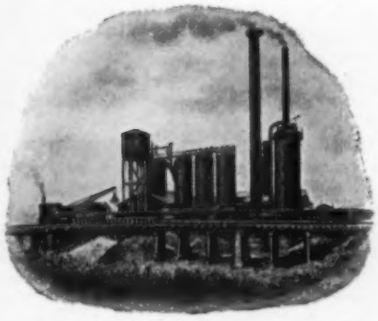
PHILADELPHIA.—The Espen-Lucas Machine Co. will build a 1-story brick machine shop, 44 x 141 feet in size to cost about $29,000.

PHILADELPHIA.—Extensive repairs will be made on the brass foundry of the L. R. Halsted estate, 1129 Cherry street, which was recently damaged by fire.

PITTSBURGH.—The Acme Brass Foundry Co. has been chartered. with $25,000 capital. H. I. Wasserman is treasurer of the company.

PUNXSUTAWNEY, PA. — The Mahoning Foundry & Machine Co. has been organized by V. A. Gillespie. The company is capitalized at $30,000.

UNIONTOWN, PA.—The Brownsville Foundry & Machine Co. has been formed and has taken over the machine shop and foundry of



DELAWARE RIVER STEEL COMPANY

MANUFACTURERS OF PIG IRON

CHESTER, PENNSYLVANIA

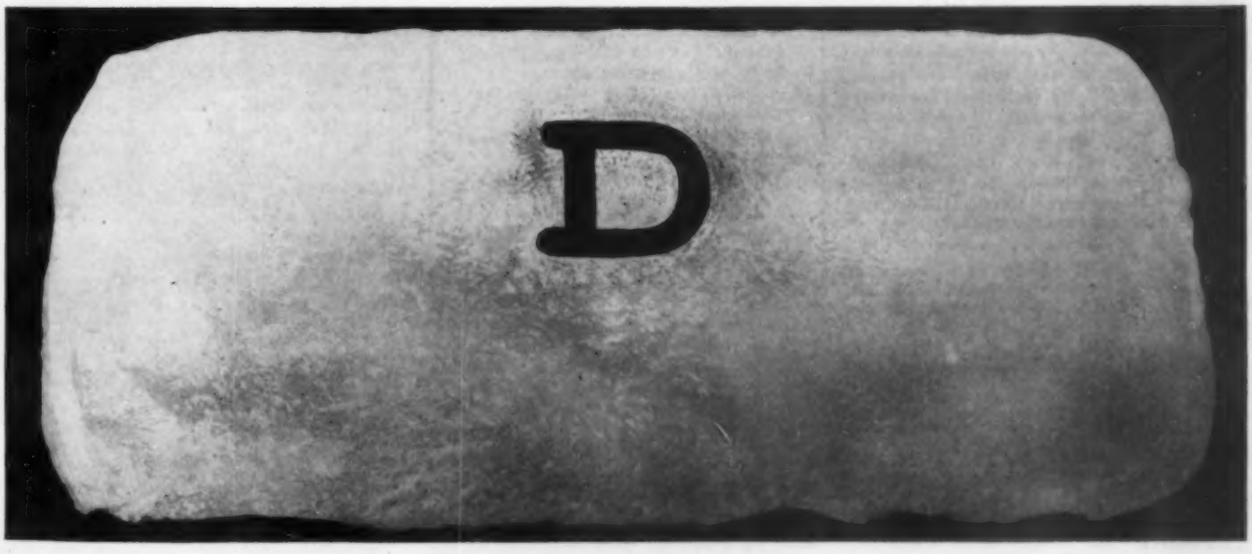
DELAWARE

100 WORDS

To Pig Iron Consumers:

Uniformity is the most desirable quality in pig iron. It is akin to dependability. Uniformity is made possible by proper casting. The Uhling Casting machine as built by Heyl and Patterson, Inc., of Pittsburgh, Pennsylvania, gives these results. No other iron is more uniform, chemically or physically, than our "Delaware" iron made since this recent installation at our plant. It is uniformly good. The pigs are evenly coated with lime and free from sand. They weigh a hundred pounds. Twenty to a net ton any where or any time. Chemical data in our next message. Always a hundred words. Uniformity.

DELAWARE RIVER STEEL CO.



J. H. Herbertson's Sons. The new company will engage in the manufacture of mine cars, for which new machinery and equipment will be purchased.

YORK, PA.—The Diamond Chain Co. plans to build a 1-story, 50 x 500 foot plant on a site of five acres which it has recently purchased at Center street and the Pennsylvania railroad.

CAMDEN, N. J.—Hare & Chase, Inc., have been organized to manufacture automobiles and supplies with $1,000,000 capital. The incorporators include F. R. Hansell, J. Vernon Pimm and S. C. Seymour, Camden.

CAMDEN, N. J.—The Evanston & Levering Co. will build a 1-story 110 x 240-foot concrete and steel scouring mill. The George Kessler Contracting Co. is in charge of construction.

JERSEY CITY, N. J.—Brandis & Co., 15 Exchange place, plans to build a factory for the manufacture of metal specialties and mechanical instruments. The company has been recently incorporated with a capital of $100,000.

JERSEY CITY, N. J. — The Everlasting Valve Co., West Side avenue, has awarded a contract for an addition to its machine shop, to cost $13,000.

JERSEY CITY, N. J.—The Co-Operative Engineering Co. has been chartered to manufacture dies, fixtures, tools and special machinery. The company is capitalized at $100,000 and has offices at 239 Washington street.

KEARNY, N. J.—The Niles-Bement-Pond Co., 111 Broadway, New York, has purchased 50 acres and will build a large plant.

NEWARK, N. J.—The American Cellon Co. has been chartered with $1,000,000 to manufacture chemicals. The incorporators include Anthony Rolleri and Joseph A. Weiss.

NEWARK, N. J.—The International Arms & Fuse Co. will erect a 600-foot addition to its plant on Grove street.

NEWARK, N. J. — Architect John F. Capen has prepared plans for a celluloid factory to be erected on Locust avenue. The building will be 40 x 100 feet in size.

NEWARK, N. J.—The Eclipse Tanning Co., Sussex avenue and Day street, will erect a 1-story brick factory, 100 x 200 feet in size, to cost $22,000.

TRENTON, N. J.—The Standard Oil Co. has purchased a site on New York avenue and contemplates erecting additions to its plant. W. M. Todd is manager.

INDIAN HEAD, MD. — A contract has been awarded to the John H. Nolan Construction Co., Munsey building, for the construction of 23 powder dry houses at the naval proving grounds. The cost is estimated at $253,677.

INDIANHEAD, MD. — The bureau of yards and docks, navy department, will build an extension to its power house.

LYNCHBURG, VA.—The Lynchburg Foundry Co. contemplates building a 1-story foundry to cost $60,000.

Activities in the Central States

CUDAHY, WIS.—The Leonard Construction Co., 332 South Michigan avenue, Chicago, has been awarded the contract for a manufacturing plant to cost $150,000.

HURLEY, WIS.—Bonds for $360,000 will be issued to build a waterworks plant.

MADISON, WIS.—Bids will be taken about Dec. 15 by the state highway commission for a 560-foot steel bridge over the Wisconsin river.

MADISON, WIS.—The plant of the Southern Foundry Co., which has been making munitions, was badly damaged by fire Dec. 1. The loss is estimated at $50,000.

MILWAUKEE.—To relieve the crowded condition of its shops resulting from government contracts, the Harley-Davidson Motor Co. has awarded a contract to the Federal Engineering Co., 218 Stephenson building, for the erection of a 1-story machine shop, 120 x 180 feet in size. The structural steel, amounting to 135 tons, will be fabricated and erected by the Northwestern Bridge & Iron Co.

NEW HOLSTEIN, WIS.—The John Lauson Mfg. Co. has increased its capital from $500,000 to $1,000,000 to provide for extension of its plant and for the purchase of additional equipment. The company manufactures tractors.

PORT WASHINGTON, WIS.—The Turner Mfg. Co. has increased its capital from $150,000 to $250,000 to provide for additions to its plant. M. Turner is vice president.

SUPERIOR, WIS.—The Globe Shipbuilding Co. is making additions to its yards and will install three electric traveling cranes.

SUPERIOR, WIS.—The Superior Iron & Steel Works is building a foundry.

WAUSAU, WIS.—Articles of incorporation have been filed by the National Auto Wheels Corp. The capital stock is $50,000 and the incorporators include Robert T. Steretzky, E. J. Coerper and M. Philopp.

DETROIT. — The Detroit Steel Products Co. will build two sash shops 79 x 270 feet and 96 x 168 feet in size, to cost $100,000.

DETROIT.—The Edmunds & Jones Co. has let the general contract for the construction of a 2-story power house adjoining its plant at Lawton avenue and Buchanan street, to E. F. Lang.

DETROIT.—The Federal Motor Truck Co has let the contract for the construction of a 2-story addition to its factory, to cost $50,000. The building will be 94 x 308 feet in size. F. J. Winter is architect.

DETROIT.—The Baker Tractor Corp. has been organized under a Delaware charter to manufacture tractors with a capital of $1,250,000. The incorporators include B. F. Mortenson, F. E. Baker and G. J. Baker.

DETROIT. — Smith, Hinchman & Grylls, architects, have taken out a building permit for the new factory to be erected by Dodge Bros. on Lynch road. The main structure will be of brick and steel, 570 x 818 feet in size. The boiler house will be 50 x 150 feet. It is estimated that the total cost will be $1,046,000.

Issues Big Tool List

The Morgan Engineering Co., Alliance, O., which has been awarded a large contract for gun carriages, has issued inquiries for 271 machine tools, representing half of the requirements for a large new ordnance plant to be erected by that company. Following is the list:

One hundred 12, 18, 24, 30 and 36-inch lathes;
Fifty-six 4, 5 and 6-foot radial drills;
Forty 3, 4 and 6-foot planers;
Eighteen 10-foot boring mills;
Ten 8-foot boring mills;
Twenty-four horizontal floor boring machines;
Twelve milling machines;
Six bevel gear planers;
Five slotters;
Broaches, saws, drill presses, grinders and miscellaneous equipment.

FLINT, MICH.—The Chevrolet Motor Co. has had plans drawn for the construction of a new $150,000 plant addition.

CHICAGO.—C. Quinlan, 124 South Green street, plans to erect a 4-story factory to cost $30,000. The company manufactures metal specialties.

CHICAGO.—McCord & Co. have taken out a permit to erect a 1-story brick foundry to cost $30,000, at 847 120th street. A. J. Bennett is architect.

CHICAGO.—The Standard Metals Reduction Corp. has been chartered with $2,000,000 capital. The incorporators include J. E. Harper, T. T. Watson and James H. Aye, 111 West Monroe street.

EAST ST. LOUIS, ILL.—The American Mfg. Co., 1026 South Eleventh street, St. Louis, is having plans drawn for a power plant 60 x 80 feet and a machine shop 60 x 70 feet to cost $70,000.

ELGIN, ILL.—The Woodruff & Edwards Foundry has been badly damaged by fire, thought to have been of incendiary origin. The loss is estimated at $75,000.

HARVEY, ILL. — The Buda Co., James Viles, president, is building a 4-story assembling plant 80 x 260 feet to cost $150,000.

HARVEY, ILL. — The American Stove Works, J. M. Clark, manager, will build a 2-story addition to cost $10,000.

MAYWOOD, ILL.—The Universal Engineering Co., 700 West Twenty-second street, Chicago, has had plans drawn for a 1-story machine shop to cost $15,000. The company manufactures kerosene motors.

PEORIA, ILL.—The Ideal Tank & Supply Co. has been organized with $1,000,000 capital. The incorporators are Michael Murphy, Robert F. Walsh and Daniel P. Toberty.

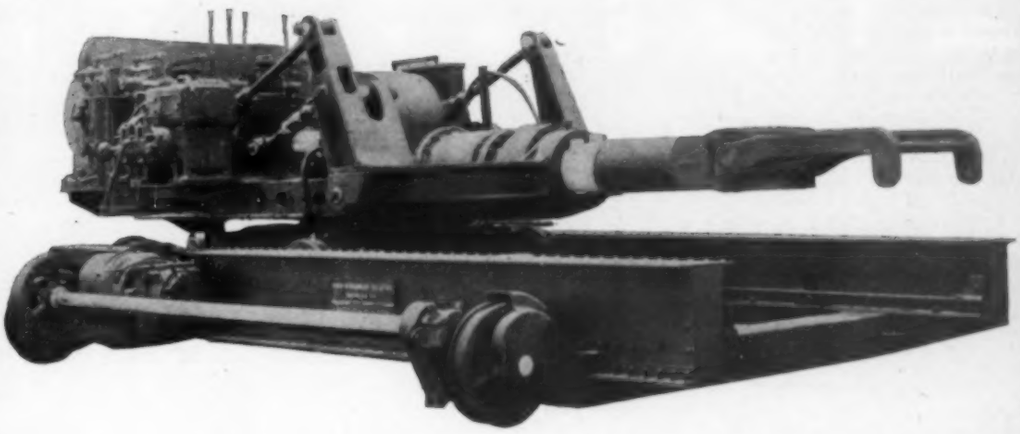
QUINCY, ILL.—The city contemplates laying two miles of water mains and purchasing considerable waterworks equipment. W. R. Gelston, superintendent of waterworks, is in charge.

ROCKFORD, ILL.—The C. Mattison Machine Co., Beloit, Wis., is building a 2-story factory 100 x 400 feet in size, to cost $60,000.

ANDERSON, IND.—The Continental File Co. is building a 1-story factory.

FRANKFORT, IND.—The Frankfort Carburetor Co. has been incorporated with a capital of $250,000 to manufacture carburetors. The incorporators are Milton T. McCarty, Richard D. Voorhees, Carl W. Sims, and Eugene O. Burget.

KOKOMO.—The Printers Machinery Co.



Floor Type Manipulators

W-S-M Floor Type Manipulators are built to be the best on the market.

For handling wheels, blooms, slabs, billets, ingots, etc., during the process of manufacture, as well as manipulating materials at the presses, hammers, or mills, we firmly believe them to be unbeatable.

Revolving about vertical and horizontal axes the tongs are so designed that they will pick up material from the floor, car or roller table, making the machine adaptable for many purposes.

For Speed, Service and all-around Usefulness the W-S-M Floor Type Manipulator will answer every requirement.

The Traveling Wheel Blank Manipulator, with revolving trolley, illustrated above is one of several built for the Standard Steel Works Company, Burnham, Pa.

Principal Products of The W-S-M Company

Steel Plant Equipment:
Manipulators, Furnaces, Charging Machines, etc.
By-Product Coke Oven Machinery.
Shipyard Cranes.
Hoisting and Mining Machinery.
Ore and Coal Handling Machinery.
Special Large Cranes.
Gas Producers, Gas Valves.
Hydraulic Turbines.
Johnson Hydraulic Valves.
Steel Castings.

WELLMAN SEAVER MORGAN COMPANY
CLEVELAND
OHIO U.S.A.

has been incorporated with $25,000 capital to manufacture binding machines. The incorporators are Reuben Hawkins, Harry M. Lynch and James C. Patton.

PERU, IND.—The Model Gas Engine Co. will double its plant capacity on account of war orders. New equipment to cost $50,000 will be purchased at once.

TERRE HAUTE, IND.—The Power Supply Co. has been organized with $60,000 capital to manufacture machinery. The directors are Ray J. Diekemper, R. D. Heer and Ben Heer.

AKRON, O. — The International Harvester Co., East Center street, will award contracts shortly for a brick and frame warehouse, to be equipped with steel sash. The cost is estimated at $50,000. The erection of a new plant is contemplated, to be built during the coming year.

BUCYRUS, O.—The American Clay Machinery Co. has awarded to the Austin Co., 14230 Euclid avenue, Cleveland, a contract for the erection of a 1-story munitions plant, to be 100 x 250 feet in size and cost $60,000.

CAMBRIDGE, O.—The Cambridge Foundry & Machine Co. has been chartered with $50,000 capital. The incorporators are Mark A. Copeland, F. B. Everts, C. M. Verby and others.

CANTON, O.—The Wilson Rubber Co. has obtained a permit to build a $20,000 factory at 1216 Garfield avenue. The structure will be 3 stories high and 44 x 120 feet in size. U. E. Clay is the contractor.

CARTHAGE, O.—The Pollak Steel Co. will construct a 1-story foundry addition 200 x 300 feet, south of its main plant. The M. Marcus Building Co. is the contractor.

CINCINNATI.—The Republic Motor Truck Co. has leased a site at McMicken avenue and Corwine street and will build two additions.

CLEVELAND.—The Cleveland Controller & Mfg. Co. has been incorporated with $200,000 capital. The incorporators include L. A. O'Neil and L. C. Spieth, 1414 Williamson building.

CLEVELAND.—The Madison Foundry Co. has awarded the contract for a 1-story addition to its foundry at 939 Addison road.

CLEVELAND. — J. Heller, 2326 Lorain avenue, is having plans prepared by Wm. Markowitz, United Bank building, for a 3-story brick and terra cotta factory to cost $50,000.

CLEVELAND.—The Vlchek Tool Co., recently incorporated with a capital of $900,000, has bought out the existing firm of the same name. The new company will erect a large factory addition at Quincy avenue and Woodhill road.

CLEVELAND.—The Scott & Foster Machine Co. has been organized by W. H. Annat and H. O. Mierke. The company is capitalized at $100,000.

DAYTON, O. — The Pennsylvania railroad has purchased a site at Fremont avenue and Walnut street on which it will build a new freight depot.

DAYTON, O.—The Thomas Mfg. Co. has increased its capital from $25,000 to $300,000 to provide for the purchase of new machinery and equipment for the manufacture of phonograph motors and parts. M. H. Mathews is president.

DAYTON, O.—The Dayton Electrical Mfg. Co. has been chartered with a capital of $125,000. The incorporators include H. C. Catrow, William V. Knoll and others.

HAMILTON, O.—The city contemplates the construction of additions to its waterworks plant, to cost $18,000. F. E. Weaver is city engineer.

Mississippi to the Rockies

CHANUTE, KANS. — The city plans to build a 250,000 gallon elevated tank. C. Pratt is city engineer.

KANSAS CITY, KANS.—Bids will be received until Dec. 18 by the city clerk for the Central avenue viaduct to be 900 feet long with steel approaches 400 feet long. One concrete covered steel span is included.

WAVERLY, KANS.—The city plans to spend $11,000 for a new engine and pump at the waterworks plant.

BEATRICE, NEBR.—Bids will be received until Dec. 18 by E. M. Burnham, county clerk, for a 45-foot and a 50-foot, 3-span truss bridge.

GREELEY, COLO.—The car barns, transformer house and machine shops of the Greeley Traction Co. have been visited by a very disastrous fire. The loss is estimated at $30,000.

POCATELLO, IDAHO.—The Union Pacific railroad, is in the market for a 15 and a 25-ton crane.

SANDPOINT, IDAHO. — W. C. Ames, manager, has awarded contracts for the erection of a 50-ton concentrating mill at the Falls Creek mine.

BISBEE, ARIZ.—An election will be held soon on issuing $375,000 in bonds to construct electric, gas and water systems.

YUMA, ARIZ.—An election will be held Dec. 11 on issuing $400,000 in bonds to build water, gas, electric light and heating plants.

KANSAS CITY, MO.—The city plans to build a pumping station of 20,000,000 gallons capacity. C. Hill is city engineer.

BEAUMONT, TEX.—The Beaumont Iron Works will add equipment, including electric transformers.

EL PASO, TEX.—The Southwestern Electric & Machine Co. has been organized and has taken over a plant, which it will enlarge. New equipment, including shapers, milling machinery and lathes, will be added.

FORT WORTH, TEX.—The Oil Machine & Mfg. Co., recently incorporated with $50,000 capital, will build a factory. J. W. Carter is manager.

HOUSTON, TEX. — The Houston Car Wheel & Machine Co., J. H. Goree, manager, will install labor-saving equipment to double the capacity of its wheel foundry.

PORT ARTHUR, TEX.—The refinery of the Texas Co. has been damaged by fire with a loss of five tank cars and 300 feet of track. The fire is said to have been started by an acetylene torch.

MADILL, OKLA.—Bonds for $65,000 will be issued to provide for building a waterworks system.

CHANUTE, KANS.—The city proposes to make several additions to its waterworks equipment, including the construction of a 250,000 gallon tank. It is estimated that the cost will reach $42,000. C. Pratt, city engineer, is in charge.

The Pacific Coast States

SEATTLE.—Plans are being drawn by H. Bittman, structural engineer, Securities building, for shipbuilding sheds, foundry, machine shop and office building, for the Patterson-McDonald Shipbuilding Co.

SEATTLE.—The Futrell Coupler Co. has been organized with a capital of $500,000. The incorporators are Louis Futrell, William Phillips and Lewis Larson.
cost about $200,000. The company is working on extensive government contracts.

SEATTLE.—Chas. C. Moore & Co., San Francisco, will construct a large plant on the north shore of Lake Union if it receives government contracts now pending.

SEATTLE.—Plans have been completed by H. Bittman, structural engineer, Securities building, for the construction of a frame plate shed for the Erickson Shipbuilding Co., to cost $35,000. This structure will house the furnaces and bending floor, copper and sheet metal shops, etc.

SEATTLE. — Swift & Co., 201 Jackson street, have obtained a permit to erect steel tanks at a cost of $16,000.

SEATTLE.—Contract has been awarded to H. Bittman, engineer, Securities building, for a 2-story mold loft to be built by the Erickson Shipbuilding Co., 4142 Indiana avenue. The building will be 80 x 360 feet, and will cost $20,000.

PORTLAND, OREG.—The Valveless Pump & Foundry Co. has leased the plant formerly occupied by the Portland Stove Works and will equip a large foundry and machine shop.

PORTLAND, OREG.—The Thomas Engineering Works has been incorporated with $100,000 capital to manufacture machinery. E. E. Thomas and H. G. Beckwith are the incorporators.

LOS ANGELES. — The Electro-Industrial Tractor Co. has been incorporated with $50,000 capital to manufacture tractors. Richard H. Norton, 335 West Twenty-seventh street, is interested.

LOS ANGELES. — The Contractors' Machinery Mfg. Co. will build a foundry.

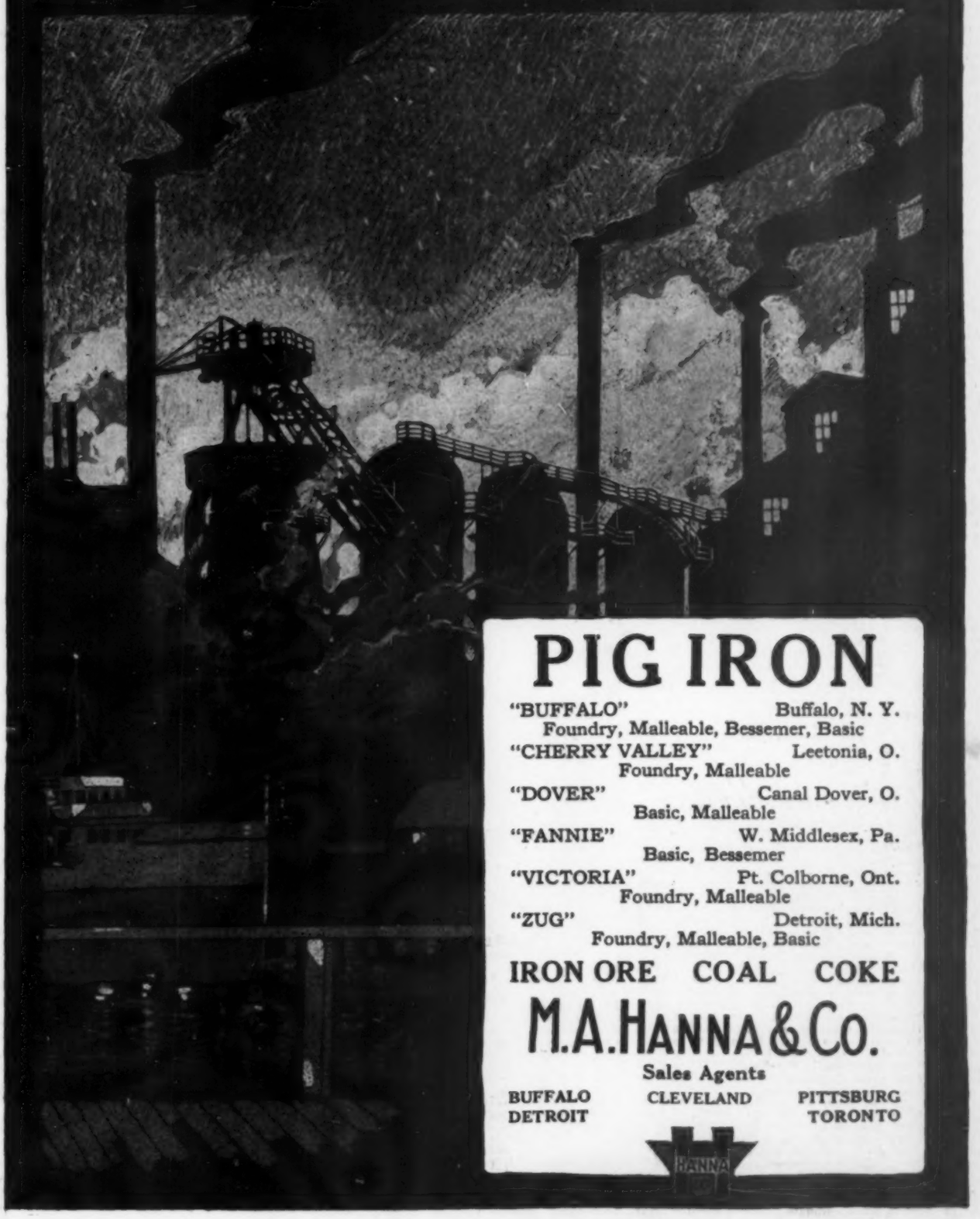
MARTINEZ, CAL.—The American-Oriental Ship Yards will erect a shipbuilding plant to cover 35 acres recently purchased. W. A. Boole, Moore & Scott Iron Works, Oakland, Cal., is in charge.

OAKLAND, CAL. — The California Wire Cloth Co. is installing machinery for the manufacture of copper and brass wire, also a battery of annealing furnaces.

SACRAMENTO, CAL.—The Southern Pacific railroad is having plans drawn for a steel manufacturing plant to cost $500,000, a switch plant to cost $50,000 and a plant for the manufacture of crossing frogs. A. D. Williams is in charge.

SAN FRANCISCO.—The commandant of the navy yard at Mare Island is taking bids for a boiler shop extension, 93 x 98 feet and for a 40-ton crane.

HANNA



PIG IRON

"BUFFALO" Buffalo, N. Y.
Foundry, Malleable, Bessemer, Basic

"CHERRY VALLEY" Leetonia, O.
Foundry, Malleable

"DOVER" Canal Dover, O.
Basic, Malleable

"FANNIE" W. Middlesex, Pa.
Basic, Bessemer

"VICTORIA" Pt. Colborne, Ont.
Foundry, Malleable

"ZUG" Detroit, Mich.
Foundry, Malleable, Basic

IRON ORE COAL COKE

M. A. HANNA & CO.

Sales Agents

BUFFALO CLEVELAND PITTSBURG
DETROIT TORONTO

Iron and Steel Prices

Corrected to Tuesday Noon

IRON ORE

Superior Ores, Per Ton, Lower Lake Ports.

Old range Bessemer, 55 iron	$5.95
Mesabi Bessemer, 55 iron	5.70
Old range non-Bess., 51½ iron	5.20
Mesabi non-Bess., 51½ iron	5.05

Port Henry Ores, non-Bessemer, Per Unit, Delivered Eastern Pennsylvania.

Old Bed, crude 55 iron	10.50c to 11.00c
Old Bed., concent., 65 iron	11.00c to 11.50c
Harmony, concent., 63 iron	11.50c to 11.75c
Lump (at mines)	$5.75c

WAREHOUSE PRICES

Steel bars, Chicago	4.10c
Steel bars, Cleveland	4.035c
Steel bars, Detroit	4.085c
Steel bars, Philadelphia	4.10c
Steel bars, New York	4.095c
Steel bars, St. Louis	4.17c
Steel bars, Cincinnati	4.08c
Steel bars, St. Paul	4.22c
Steel bars, Buffalo	4.05c
Iron bars, Buffalo	4.65c
Iron bars, Chicago	4.10c
Iron bars, Cleveland	3.985c
Iron bars, Detroit	4.75c
Iron bars, St. Louis	4.17c
Iron bars, Cincinnati	4.08c
Iron bars, Philadelphia	4.50c
Iron bars, New York	4.659c
Shapes, Chicago	4.20c
Shapes, Detroit	4.185c
Shapes, St. Louis	4.27c
Shapes, St. Paul	4.32c
Shapes, New York	4.195c
Shapes, Cleveland	4.135c
Shapes, Philadelphia	4.20c
Shapes, Buffalo	4.15c
Shapes, Cincinnati	4.18c
Plates, Buffalo	4.40c
Plates, Chicago	4.45c
Plates, Detroit	4.435c
Plates, St. Louis	4.52c
Plates, St. Paul	4.57c
Plates, New York	4.445c
Plates, Cleveland	4.385c
Plates, Philadelphia	4.45c
Plates, Cincinnati	4.43c
No. 10 blue anl. sheets, Chi.	5.45c
No. 10 blue anl. sheets, Cleve.	5.00c
No. 10 blue anl., Buffalo	5.40c
No. 10 blue anl., shets, St. L.	5.52c
No. 10 blue anl. sheets, Cinci.	5.43c
No. 10 blue anl. sheets, St. Paul	5.57c
No. 10 blue anl. sh., Detroit	5.435c
No. 28 black sheets, Chgo.	6.45c
No. 28 black sheets, Cleve.	6.35c
No. 28 black sheets, Cinci.	5.45c
No. 28 black, Detroit	6.435c
No. 28 black sheets, St. L.	6.52c
No. 28 black sheets, St. Paul	6.57c
No. 28 galv. sheets, Chgo.	7.70c
No. 28 galv. sheets, Cleve.	7.60c
No. 28 galv. sheets, Cinci.	6.65c
No. 28 galvanized, Detroit	7.685c
No. 28 galv. sheets, St. L.	7.77c
Hoops, Cleveland	8.00c
Hoops, Detroit	6.50c

IRON AND STEEL SCRAP

STEEL WORKS USE

(Gross Tons)

Bundled sheets, Pittsburgh	$22.00 to 23.00
Bundled sheets, Cleveland	22.00 to 22.50
Bundled sheets, Buffalo	19.00 to 20.00
City wrought, short, N. Y.	24.00
Frogs, switches, guards, St. L.	29.00 to 29.50
Heavy melting steel, Pitts.	30.00
Heavy melting steel, Buffalo	30.00
Heavy melting steel, Chgo.	28.50 to 29.50
Heavy melt'g steel, Cleveland	29.00 to 29.50
Heavy melting steel, Cinci.	25.00 to 25.50
Heavy melting steel, east. Pa.	27.00 to 29.00
Heavy melting steel, N. Y.	25.00 to 25.50
Heavy melting steel, St. L.	27.00 to 27.50
Heavy melting steel, Birming.	21.50 to 22.50
Hydraulic press. sheets, Cleve.	25.00 to 25.50
Hydraulic press. sheets, Pitts.	24.00 to 25.00
Hydraulic press. sheets, Chgo.	26.00 to 26.50
Low phos. steel, Buffalo	40.00 to 42.00
Low phos. steel, Pittsburgh	38.00 to 40.00
Low phos. steel, eastern Pa.	35.00 to 37.00
Shoveling steel, Chicago	27.50 to 28.00
Shoveling steel, St. Louis	26.00 to 26.50
Steel rails, short, Chicago	34.00 to 34.50
Steel rails, short, Cleveland	31.00 to 32.00
Steel rails, short, St. Louis	36.50 to 37.00
Steel rails, old, Birmingham	28.00 to 30.00
Stove plate, Cincinnati	16.00 to 16.50
Stove plate, St. Louis	16.50 to 17.00
Stove plate, N. J. points	19.50 to 20.00
Stove plate, Birmingham	18.00 to 19.50
Stove plate, Buffalo	21.00 to 22.00
Stove plate, eastern Pa.	22.00 to 23.00
Stove plate, Cleveland	19.00 to 20.00
Stove plate, Pittsburgh	20.00 to 21.00
Cast iron borings	11.00 to 12.00

(Net Tons)

Boiler plate, cut, No. 1, Chgo.	$19.00 to 20.00
Boiler plate, cut, No. 1, St. L.	19.50 to 20.00
Bundled sheets, Cincinnati	17.00 to 17.50
Knuckles, coup., Chicago	34.00 to 34.50
Knuckles, coup., St. Louis	30.50 to 31.00
Springs, Chicago	38.50 to 39.00
Stove plate, Chicago	18.25 to 19.25

Freight Rates, Pig Iron

Mahoning and Shenango valleys to:	
Cleveland	$0.95
Newark, N. J.	3.50
Boston	3.70
Philadelphia	3.30
Pittsburgh	.95
St. Louis	3.18
Minneapolis, St. Paul	4.54
Buffalo to:	
Albany, N. Y.	$1.26
New England (rail)	3.10
New York and Brooklyn (rail)	3.10
Virginia furnaces to:	
Philadelphia	$3.27
New England	3.77
Brooklyn, Jersey City, Newark	3.32
Birmingham, Ala., to:	
Boston	6.00
Cincinnati	2.90
Chicago	4.00
Cleveland	4.00
Louisville, Ky.	2.65
Minneapolis, St. Paul	5.85
New York (r. and w.)	6.00
Philadelphia (r. and w.)	5.25
Pittsburgh	4.90
Savannah, Ga.	2.75
St. Louis	3.40
Chicago to:	
Des Moines	$2.80
Milwaukee	.50
Minneapolis, St. Paul	2.00
Moline, Ill.	1.15
Omaha	3.58
St. Louis	1.58
Ironton and Jackson, O., to:	
Chicago	$2.54
Cincinnati	1.26
Cleveland	1.62
Detroit	1.81
Indianapolis	1.58
Minneapolis, St. Paul	4.54
Duluth, Minn., to:	
Minneapolis-St. Paul	$1.25
Mayville, Wis.:	
Minneapolis-St. Paul	$1.75

Freight Rates, Finished Material

Pittsburgh, carloads, per 100 lbs., to:	
New York	19.5 cents
Philadelphia	18.5 cents
Boston	21.5 cents
Buffalo	16.0 cents
Baltimore	18.0 cents
Cleveland	13.5 cents
Cincinnati	17.0 cents
Chicago	21.5 cents
Detroit	15.7 cents
Minneapolis and St. Paul	32.9 cents
Denver	79.0 cents
St. Louis	27 cents
New Orleans	30 cents
Birmingham	45 cents
Pacific coast (all rail)	75 cents
Pacific coast (tin plate)	75 cents

IRON MILL USE

(Gross Tons)

Busheling, No. 1, Cleveland	25.75 to 26.75
Busheling, No. 1, Buffalo	26.00 to 27.00
Busheling, No. 2, Buffalo	17.00 to 18.00
Busheling, No. 1, Pittsburgh	21.00 to 22.00
Cast borings, New York	17.50
Cast borings, eastern Pa.	19.00 to 20.00
Cast borings, Cleveland	18.00 to 18.50
Cast borings, Buffalo	19.00 to 20.00
Cast borings, Pittsburgh	20.00
Cast borings, Birmingham	13.00 to 15.00
City wrought, long, N. Y.	31.00 to 32.00
Forge flashings, small, Cleve.	23.50 to 24.00
Forge flashings, large, Cleve.	22.00 to 23.00
Forge No. 1, Eastern Pa.	22.50 to 23.50
Grate bars, Buffalo	20.00 to 21.00
Grate bars, Cleveland	20.00 to 21.00
Grate bars, N. J. points	19.50 to 20.00
Iron axles, Pittsburgh	42.00 to 44.00
Iron axles, Cincinnati	42.00 to 42.50
Iron axles, Cleveland	49.50 to 50.00
Iron axles, eastern Pa.	50.00 to 55.00
Iron axles, Chicago	36.00 to 37.00
Iron rails, Chicago	36.00 to 37.00
Iron rails, Buffalo	37.00 to 38.00
Iron rails, Cincinnati	32.50 to 33.00
Iron rails, St. Louis	35.50 to 36.00
Iron rails, Cleveland	40.00 to 40.50
Machine turnings, Cleve.	18.00 to 18.50
Machine turnings, Buffalo	18.00 to 18.50
Machine turnings, N. Y.	15.50 to 16.00
Machine turnings, Pitts.	20.00
Machine turnings, east. Pa.	18.50 to 19.50
Machine turnings, Birming.	17.00 to 18.00
Pipes and flues, Cleveland	23.75 to 24.75
R. R. mch. cast, No. 1, Buff.	30.00 to 31.00
R. R. wrgt. No. 1, Buffalo	35.00
R. R. wrgt., No. 1, east, Pa.	35.00
Railroad wrgt., No. 1, Cleve.	33.50 to 34.50
R. R. wrought, No. 1, Pitts.	35.00
R. R. wrgt. No. 1, Birming.	28.00 to 35.00
Wrought pipe, Buffalo	26.00 to 27.00
Wrought pipe, eastern Pa.	30.00 to 32.00
Wrought pipe, New York	29.00

(Net Tons)

Angle bars, iron, Chicago	$37.00 to 37.50
Angle bars, steel, St. Louis	25.00 to 26.00
Arch bars & transoms, St. L.	42.00 to 42.50
Arch bars & transoms, Chgo.	37.50 to 38.50
Busheling, No. 1, Chicago	24.50 to 25.50
Busheling, No. 1, Cincinnati	21.00 to 21.50
Busheling, No. 1, St. Louis	22.50 to 23.00
Busheling, No. 2, Chicago	17.00 to 17.50
Cast borings, Cincinnati	13.00 to 13.50
Cast borings, St. Louis	16.00 to 16.50
Cast borings, Chicago	17.00 to 17.50
Cut forge, Chicago	29.00 to 29.50
Iron axles, St. Louis	44.00 to 44.50
Iron axles, Chicago	45.50 to 46.50
Machine turnings, Chgo.	16.75 to 17.25
Machine turnings, Cinci.	13.00 to 13.50
Machine turnings, St. L.	16.75 to 17.25
Pipes and flues, Chicago	22.00 to 23.00
Pipes and flues, St. Louis	21.50 to 22.00
Railroad wrgt., No. 1, Chgo.	31.00 to 32.00
Railroad wrgt., No. 1, Cinci.	28.50 to 29.00
Railroad wrgt., No. 1, St. L.	31.00 to 31.50
Railroad wrgt., No. 2, Chgo.	29.00 to 29.50
Railroad wrgt., No. 2, St. L.	29.00 to 29.50

IRON OR STEEL WORKS USE

(Gross Tons)

Axle turnings, Cleveland	$23.00 to 24.00
Axle turnings, Buffalo	26.00 to 27.00
Shafting, New York	34.00
Shafting, eastern Pa.	38.00 to 40.00
Steel car axles, Birmingham	32.00 to 33.00
Steel car axles, New York	46.00
Steel car axles, Buffalo	45.00
Steel car axles, Cleveland	46.00 to 47.00
Steel car axles, Pittsburgh	40.00 to 42.00
Steel car axles, eastern Pa.	50.00 to 55.00

(Net Tons)

Shafting, St. Louis	30.50 to 31.00
Steel car axles, St. Louis	42.50 to 43.00
Steel car axles, Chicago	41.00 to 42.00

IRON FOUNDRY USE

(Gross Tons)

Car wheels, (iron), Pitts.	30.00 to 31.00
Car wheels, (steel), Pitts.	33.00 to 35.00
Car wheels, eastern Pa.	33.00 to 35.00
Car wheels, Buffalo	32.00 to 33.00
Car wheels, Chicago	29.00 to 30.00
Car wheels, St. Louis	29.50 to 30.00
Car wheels, Birmingham	25.00 to 30.00
Car wheels, Cleveland	26.50 to 27.00
Tram car wheels, Birming.	20.00 to 25.00
Cast, No. 1, Birmingham	23.50 to 25.00
Cast, 1, machy., N. J. points	32.00 to 33.00
Cast No. 1, Cleveland	26.75 to 27.75
Cast, 1, heavy, N. J. points	30.00
Cast, No. 1, eastern Pa.	31.00 to 33.00
Cast, No. 1, Pittsburgh	28.00 to 29.00
Malleable railroad, Cincinnati	20.50 to 21.00
Malleable railroad, Cleveland	27.00 to 27.50
Malleable railroad, Buffalo	29.00 to 30.00
Malleable railroad, Pittsburgh	28.00 to 29.00
Malleable railroad, east. Pa.	30.00 to 32.00

(Net Tons)

Cast, No. 1, Chicago	24.50 to 25.00
Cast, No. 1, Cincinnati	24.50 to 25.00
Cast, No. 1, St. Louis	21.50 to 22.00
Malleable railroad, Chicago	28.00 to 28.50
Malleable railroad, St. Louis	25.00 to 26.00
Malleable agricultural, Chgo.	23.50 to 24.50

MISCELLANEOUS USES

(Gross Tons)

Reroll. rails, 5 ft. & ov., Pitts.	$34.00 to 36.00
Reroll. rails, 5 ft. & ov., Chgo.	35.00 to 35.50
Reroll. rails, 5 ft. & ov., E. Pa.	37.00 to 40.00
Reroll. rails, 5 ft. & ov., St. L.	35.50 to 36.00
Reroll. rails, 5 ft. or ov., Cleve.	37.00 to 38.00
Rerolling rails, long, Birming.	37.50 to 38.50

(Net Tons)

Boiler punchings, Chicago	31.50 to 32.00
Locomotive tires, Chicago	36.00 to 37.00
Locomotive tires, St. Louis	32.50 to 33.00